MAUCH CHUNK TO ELIZABETHPORT.

L. V. Railroad from Mauch Chunk to Easton	$1 84
C. R. R., N. J., Easton to Elizabethport	2 69
Shipping expenses at Elizabethport	25
Warfage	10
Total	$4 88

MAUCH CHUNK TO PORT JOHNSON.

L. V. R. R., or L. & S. R. R. from M. C. to Easton	$1 84
C. R. R., of N. J., Easton to Pt. Johnson	2 72
Shipping expenses	25
Warfage	10
Total	$4 91

TO HOBOKEN.

L. V. R. R., Mauch Chunk to Easton	$ —
Morris & Essex R. R. Easton to Hoboken	—
Shipping expenses	—
Warfage	—
Total	$ —

TO SOUTH AMBOY.

L. V. R. R.	—
B. & D. R. R. / Cam. & Am. R. R.	—
Shipping Expenses,	—
Total	$ —

PENN HAVEN TO ELIZABETHPORT.

L. V. RR. Penn Haven to Easton	—
C. RR. of N. J. Easton to Elizabethport	—
Shipping expenses	—
Wharfage	—
Total	$ —

Freights.—March, 1871.

TO EASTERN PORTS.	From Philada.	From E. Port and Port Johnston.	From Newburg...	From Rondout....
Amesbury	$2 50	$2 00		
Bangor	2 30	1 60		
Bath	2 10	1 75		
Boston	1 75	1 85		
Bridgeport	2 00	1 00		
Bristol	2 75	1 40		
Cambridgeport	2 00	2 00		
Derby	2 30	1 20		
Dighton	—	—		
East Cambridge	2 35	2 00		
Fall River	2 00	1 40		
Hackensack	1 75	1 00		
Hartford	2 50	1 50		
Jersey City	1 40	60		
Middletown	2 25	1 25		
Mystic	—	1 25		
New Bedford	2 00	1 40		
Newburyport	2 65	1 85		
New Haven	1 90	1 00		
New London	1 75	1 25		
Newport	2 00	1 40		
New York	1 35	60		
Norwalk	1 80	1 00		
Norwich	2 00	1 30		
Pawtucket	2 30	1 50		
Portland	2 30	1 50		
Portsmouth, N. H.	1 45	1 85		
Providence	2 00	1 25		
Rockport	2 10	1 65		
Saco	2 25	1 75		
Sag Harbor	1 70	1 20		
Salem	2 35	1 65		
Stamford	2 00	1 00		
Stonington	2 00	1 30		
Taunton	2 30	1 75		
Warren	—	1 40		
Washington	1 25			
TO RIVER PORTS.				
Albany				
Catskill				
Cocksackie				
Coeyman's				
Cold Spring				
Fishkill				
Haverstraw				
Hudson				
New York				
Nyack				
Poughkeepsie				
Rhinebeck				
Rondout				
Saugerties				
Sing Sing				
Stuyvesant				
Tarrytown				
Troy				
West Point				
Yonkers				

METALS.

NEW YORK, March 11, 1871.

IRON.—Duty: Bars, 1 to 1¼ cents ℔ lb; Railroad, 70 cents ℔ 100 lbs.; Boiler and Plate, 1½ cents ℔ lb; Sheet, Band, Hoop, and Scroll, 1¼ to 1¾ cents ℔ lb; Pig, 7 ℔ ton; Polished Sheet, 3cents ℔ lb; Galvanized 2½; Scrap Cast, $6; Wrought, 8 per ton.

	Store Prices.
Pig, Scotch No. 1, ℔ ton	31 00@34 00
Pig, American, No. 1	34 00@35 00
Pig, American, No. 2	32 00@33 00
Pig, American, Forge	31 00@32 00
Bar Refined, English and American	— —@75 00
Bar Swedes, assorted sizes (gold)	85 00@100 00

	Store Prices, Cash.
Bar, Swedes, ord'y sizes, less 5 ℔ ct.	— —@110 00
Bar, Refined " "	75 00@ 80—
Bar, Common " "	70 00@ — —
Scroll " "	97 50@125 —
Ovals and half-round " "	97 50@125 —
Band " "	92 50@ 95 00
Horse Shoe " "	95 — — —
Rods, ⅜ to 3-16 inch " "	82 50@ — —
Hoop " "	102 50@140 00
Nail rod	— —@6¾ —
Sheet, Russia, as to Nos. (gold)	10¼@—11
Sheet, Single, D. and T. Common	—4½@— 6
Sheet, Galv'd, Nos. 14 to 26 10 and 12c. Nos. 27, 28, and 29, 13@14	
Rails, English (gold), ℔ ton	56 00 @58 00
Rails, American, at Works in Pa.	54 50 @59 00

STEEL.—Duty: Bars and ingots, valued at 7 cents ℔ lb or under, 2¼ cents; over 7 cents and not above 11, 3 cents ℔ lb; over 11 cents, 3½ cents ℔ lb, and 10 ℔ cent ad val. (Store prices.)

English Cast (2d and 1st quality) ℔ lb	— 15 @— 18
English Spring (2d and 1st quality)	— 7 @— 10
English Blister (2d and 1st quality)	— 10 @— 17
English Machinery	— 11½@— 14
English German (2d and 1st quality)	— 13 @— 15
American Blister "Black Diamond"	— — @— 12
American, Cast, Tool do.	— 16 @— 17
American, Spring, do.	— 9 @— 11
American Machinery, do.	— — @— 12
American German, do.	— 9 @— 12

COPPER.—Duty: Pig, Bar, and Ingot, 5; old Copper 20 cents ℔ lb; Manufactured, 45 per cent. ad val.

	All Cash.
Copper, New Sheathing, ℔ lb	— @— 30
Copper Bolts	— @— 32
Copper Braziers, 16oz. and over	— @— 32
Copper Nails	— @— 37
Copper, Old Sheathing, &c., clean	19 @— 20
Copper, Chili Pig	— @—
Copper, American Ingot	21¼@— 21¾
Yellow Metal, New Sheating	— @— 22
Yellow Metal Bolts	24 @— —
Yellow Metal Nails	— @— 22

LEAD.—Duty: Pig, $2 ℔ 100 lbs.; old Lead, 1¼ cents ℔ lb: Pipe and Sheet, 2½ cents ℔ lb.

Galena, ℔ 100 lbs	$— @— —
Spanish (gold)	6 20 @6 25
German, do.	6 20 @6 25
English, do.	6 20 @6 50
Bar (net)	— — @8 75
Pipe (net)	— — @10 25
Sheet	— — @10 25

Colwell, Shaw & Willard Tin-Lined Pipe 15 cts. ℔ lb.

TIN.—Duty: Pig, Bars, and Blocks, 15 ℔ cent. ad val.; Plate and Sheets and Terne Plates, 25 ℔ cent.; Roofing 25. ad val.

	Gold ℔ lb.
Banca	38½@—
Straits	32½@33
English	— @32½

PLATES.

Fair to Good Brands.	Gold.	Currency.
I. C. Charcoal, ℔ box	$8 @9 00	$10 00 @10 50
I. C. Coke	7 37½@7 75	8 37½@ 8 75
Coke Terne	6 25 @7 25	7 00 @ 8 00
Charcoal Terne	7 75 @8 25	8 75 @ 9 50

REMARKS.

IRON.—There continues quite an active demand for Scotch Pig, but the stock is somewhat reduced, and business has been in a measure restricted, the advance noted in our tables, however, is fully maintained—250 tons Glengarnock sold at $33, 200 do. Garthsherrie, $32, and 500 do. Coltness, Eglinton and Glengarnock, on private terms. The market for American remains quiet, there being no disposition on the part of the holders to operate, and prices still have an upward tendency—we quote No. 1 $34 @ $35, and No. 2 $32 @ $33. Wrought Scrap continues in request, and we notice sales of 6 @ 700 from yard at about $89. Rails remain quiet but steady at $55 @ $57, gold, for English, and $70 @ $72, currency, for American at the works in Pennsylvania. Refined Bar from store is stronger, and an advance is confidently looked for within a few days.

COPPER.—The manufactures of Copper and Yellow Metal are steady at our quotations. Ingot is dull and irregular. The bulk of the stock is in speculative hands, and not offered at present quotations, but the limited demand is supplied by holders of outside parcels at prices rather in buyers' favor. The sales embrace about 200,000 lb. Lake at 21½ to 21¾ cents. Baltimore and Tennessee is held at the same price as Lake.

TIN.—Pig is still neglected, and prices are in a great measure nominal. We quote Straits 32¾a33 cents, English 32¾, and Banca 38½, all gold. Plates are in fair demand at the prices previously ruling. Sales have been made of 1250 bxs. Charcoal Tin at $8 62½a$8 75 for I. C., part short time; 250 do. Charcoal Terne, $7 75a$7 87½, gold; 500 do., 300 do. Coke Terne. and 500 do. Coke Tin, on terms not made public.

LEAD.—The demand for Pig is very limited, and we hear of no sales. We quote ordinary Foreign $6 20, gold; Bar 8¾c., and Sheet and Pipe 10¼c., cash, less 10 per cent. to the trade.

STEEL.—Business is only moderate, and stocks are good.

SPELTER.—The business is limited, and we have only to notice the sale of 30 tons Silesian at 6c., gold.

ZINC AND ZINC PAINT.—Spelter, foreign Silesian, 6c. gold; Zinc Sheet, foreign, 9c.; Zinc, white, 10c.; American, 7c.; Manganese, high test, 5c.

San Francisco Stock Market.

A telegram from San Francisco March 9, quotes mining stocks as follows:—

Savage	41¾
Yellow Jacket	48
Kentuck	47¾
Chollar Potosi	72
Gould & Curry	no sale
Belcher	24¼
Imperial	15
Amador	no sale
Crown Point	—
Hale & Norcross	—

The Slate Trade.

[Corrected weekly.]

(A "square" represents 100 superficial feet.)

PRICES OF ROOFING SLATE.

Vermont purple, 1st quality, per square	$6 50@ 7 00
" green, 1st " "	6 50@ 7 00
" red, 1st " "	15 00@16 00
" variegated, "	5 75@ 6 20
d. b'k and d'k blue, 1st qual., "	6 00@ 7 05

How the Excavations are conducted at Pompeii

An "excavation pic-nic" took place at Pompei last month, in honor of the arrival of Professor Pierce and the other members of the American Eclipse Expedition. A correspondent of the Boston *Advertiser* describes the scene: "On arriving at Pompeii the party were first conducted to the present limit of the excavations, that they might witness the entire process of the labor. The wheelbarrow is still unkown to the Italian laborer, and his rude broad pick and his *zappa*, which serves alike for hoe and spade, would be disdained by the meanest of an American's adopted fellow-citizens. Men and women, boys and girls, are employed indifferently, and go scrambling and chattering up the steep bank, with their little basketful of dirt upon head or shoulder. A miniature railway, operated by boy-power, is laid near the edge of the cutting, and as fast as the cars are filled they are pushed away, beyond the lines of the city walls, and beyond the amphitheatre, where their contents are dumped. Close upon the diggers follow another set of workmen. These prop up crooked walls; repair breeches made by tearing down the roof supports and lintels, if these are of such extent as to threaten the crumbling of the partitions; cut out and carry away such mural paintings and tablets as have any unusual value and can be removed in good condition, or roof over and otherwise protect such as must be left in place, but might suffer from exposure.

Just at present the excavators are revealing nothing of any intrinsic value, for the street now opening appears to have been almost exclusively occupied by mining shopkeepers—some of them possibly in the military equipment business, for a portion of a full-length and life-sized painting of a Roman legionary in complete armor has recently been brought to light beside one shop-door. In many other places in the neighborhood are painted up what seems to be the names of candidates for various local offices, so that perhaps this district was the haunt of the ward politicians of an older day. Accordingly, Professor PIERCE'S party were warned that they must not anticipate the finding of any treasures, nor even be disappointed if nothing were found, for this is the case with many buildings, everything having been either carried away or destroyed.

The street itself must have been a pretty one, for the buildings throughout nearly its entire length were painted in high alternate panels of red and black, relieved with some light ornament. Doubtless it was also a lively one, for beside all its shops, it boasted a livery stable, in front of whose broad doorway the sidewalk was sloped to the roadway, that the chariots might roll out freely. The more modest art of donkey-riding, too, found its opportunities here, for a great room in the rear of the stable indicates by its frescoes that the proprietor did not content himself alone with "carriage customers."

Two or three of the more promising shops and houses had been reserved by the superintendent for particular attention, and in front of them chairs had been placed for the company. The *debris* had been left, as we have intimated above, to the depth of two or three feet over the floors, and the doorway had been blocked by large stones to keep the looser dust from rolling out into the clean-kept street. A dozen men were immediately set to work, and about as many *csutodi* stood by, watching with all the sharpness of their long trained eyes that nothing might be caught up and concealed. Experience has taught the directors in what part of each particular building objects are most likely to be found; and, therefore, while one man was digging away with the utmost *insouciance*, his fellow, close beside him, would be upon his knees carefully scraping away the dirt with his fingers.

The first building was evidently a shop, with a living-room at the back, but there was no external indications of its character. Digging soon developed a great iron furnace or oven, leaden-covered, and set in brick, in the centre of the front room; and the most popular surmise was the owner had been a cook, for a few bronze vessels of the saucepan type were found near the furnace, together with the bones of two or three dogs and cats which imagination figured as having sought the shop after its master's flight, in search of fat pickings, and as having paid for their gluttony more dearly than by a beating.

A couple of wine *amphoræ*, a lamp, a bit of money, a bronze ring, some ivory pallets for the hinges of doors and movables, a door-key, and a few nails, composed the treasure-trove, the back room being absolutely empty. Fragments of the red tiles and some charred bits of the wood-work, which throughout the city was almost all ignited by the blazing cinders of the *dies iræ*—were mingled with the ashes and pumice. as also were a few broken jars and lamps; but all the latter pieces were broken to atoms as fast as found, that nothing recognizable as a bit of Pompeii might go elsewhere than into the museum. The next door neighbor of our shopkeeper had left nothing for posterity but his simple mosaic pavement; perhaps, on the other hand, we thought, his friend had left his trifles behind him in order to take his stone carpet with him, for in his two rooms we found nothing but the base earth for flooring.

The Coal Famine.

If the country be not acquainted with the merits and demerits of the coal imbroglio, it will not be for lack of literary elucidation or perplexity of the subject. The pen brandishes its torchlights above the Vulcanian wrangle, and tries to light up the arena of the combatants; but about all that can plainly be made out is that capital and labor are having one of their periodical strifes. Who began it? who perpetuates it? what its final merits are, are questions which it is not easy to settle to the satisfaction of all concerned. It is an old strife, which breaks out now and then in the coal regions; a sort of fluctuating cutaneous malady, which is occasionally mitigated by the empiricism of compromise; but it manifests itself again on the least provocation, showing that it is constitutional, or that for its eradication constitutional treatment is necessary.

It seems pretty clear that there is no serious difference between the employers and the operatives. The majority of the latter would be glad to accept the terms offered by the former to go to work. But they are restrained by a tyranny which has grown up amongst them, and which lodges in a few irresponsible hands an authority over their action which is practically absolute and despotic. Like Frankenstein, they have built to themselves an image which they can not control, but which, on the contrary, coerces its creators to do its bidding. If it tells them to strike, the picks drop from thirty thousand hands, and hunger invades the cottages and cabins of a principality. They have no means of appeal or remonstrance which they can employ with sufficient celerity and directness to be of any practical service to them, even if they had not a blind and superstitious subservience to the leaders whom they have placed over them. Months and months are wasted each year in compulsory idleness, while capital loses its legitimate profit, the laborer his wages, and the consumer of coal bears his own not inconsiderable share of the burden. It is this anomalous and arbitrary state of things from which the great producing and transporting companies are endeavoring to relieve themselves.

In this it is certain that they have the sympathy of the majority of their workmen, and are only combated by the handful of schemers and conspirators, who, doing no work themselves, supported by the operatives whose interest they injure while pretending to guard them, stand between the workingman and the employer, and do their best to blight the prosperity of each. It is time that a power so uniformly injurious in its effects should be extinguished; that the workman should demand in return hit surrendered freedom of action, and that the employer should enforce his right so to manage his business as to keep out of bankruptcy—a direction in which the coal-producing business of Pennsylvania has been, owing to the cause we have mentioned, steadily drifting for the last year or two. Hardly a colliery in Pennsylvania last year paid mining expenses. In Schuylkill county alone, the loss of the operators during the twelve months is computed at two and half millions of dollars.

Intelligent and candid men, thoroughly familiar with the subject, attribute this loss solely to the arbitrary course of the Miners' and Laborers' Benevolent Association, to the protracted strikes which they compelled, and the high prices upon which they insisted. It is probable that other causes may have co-operated with this. It is known that the producing capacity of the Pennsylvania coal fields, and the transporting capacity of the several lines of railroad and canals leading from thence to market, are greatly in excess of any present demand. The producer is therefore occasionally likely to get in the market less for his produce than it costs to deliver it there; but when to this condition, inseparable from the industry, is added the arbitrary and ruinous exactions of the operatives, the prolonged strikes, involving a complete suspension of labor just at the time when labor would be most profitable to the employer, the business becomes one so insecure and precarious as to drive capital and enterprise out of it, and leave the workmen in the condition of the youth who killed the goose that laid him golden eggs.

The wages which the rulers of the Miners' Association have deemed inadequate, and for the increase of which they have ordered strikes, have been much larger than those paid in the vicinity for other sorts of labor, and, indeed, more than equal to the average reward of industry in the various handicrafts throughout the country. The popular clamor against the capitalists will, therefore, be seen to have no basis in reason. They are not archangels, we know, and, unless compelled, they do not often give more for labor or anything else than its market rate; but, in the present case, we do not see that any just censure can be cast upon them. They are opposing a meddlesome and self-constituted cabal, which dominates and awes the industry of an immense region, and which has either got to be overthrown, or it will perpetuate the injuries which it has already so extensively inflicted upon the laborer, the employer, and upon the community, which depends for light and warmth upon the mines, of which it impudently claims the right to arrest the product.—*N. Y. Standard.*

Petroleum as Fuel.

THE question of utilizing crude petroleum for the purposes of fuel, which has attracted the attention of many scientific and practical men ever since the discovery of that article, seems at last to be in a fair way of solution. A series of remarkable experiments have hitherto been tried to utilize the immense heat-producing power of petroleum, and three different plans were tested by the Navy Department in 1867. These, however, all brought petroleum into direct contact with fire, and were therefore fraught with much danger as well as many chemical difficulties.

The great aim, therefore, was to discover a process whereby the tendency to carbonization should be overcome. This difficulty has been done away with.

The apparatus consists of a cylinder, like a small locomotive boiler set on end, with a smaller cylinder within it, the intervening space being filled with petroleum. The smaller cylinder is filled with six hundred small copper tubes, and through these the superheated steam passes, producing vapor from the oil that fills the interstices between the tubes. This vaporized oil rises through a layer of prepared sponge, and just at the point of exit is mixed with superheated steam in any required proportion, thus producing hydrocarbon gas. This gas passes through iron tubes to the point where the fuel is needed, and is there burned, very much like common gas. In the case which was shown, the kiln was filled with stone. and in a very short time after the fire was lighted the heat was more intense than can be expressed by comparison. All this time the fire was under perfect control, and by a simple turn of a screw the combustion was made more or less intense. The experiment was varied by admitting a greater or less proportion of steam into the pipes, so that in some cases the fire was fed with fifty per cent. or more of water, and the remainder of vaporized oil.—*Chicago Evening Mail.*

On High Speed of Pistons.

A Paper on this subject was read before the Polytechnic Club of the American Institute, by Mr. DUDLEY BLANCHARD, and the following debate ensued.

THE author took exception to the positions advanced by Mr. CHARLES T. PORTER on high speed pistons, at a recent meeting of the Polytechnic. The difference of opinion was chiefly the result of a misconception of the terms used by Mr. PORTER.

Mr. BLANCHARD endeavored to make his position clear by the following illustration :—Let the fly-wheel of a steam engine, which is nothing more or less than a reservoir of power, be represented by a reservoir of water, into which that fluid is being pumped by a succession of intermittent impulses, in the usual manner. In this case each impulse of the pump makes but little comparative difference in the amount of water accumulated in the reservoir, therefore a steady and continuous stream may flow from the reservoir. Now, if we place between this reservoir and the pump a smaller reservoir, connected with each, and so arranged that it shall fill itself from the pump and discharge itself into the large reservoir at each stroke of the pump, then we shall have the action of the steam engine—so far as relates to the momentum accumulating in the piston—fairly represented. This smaller reservoir, which is to empty and fill itself at each intermittent impulse of the pump, represents the capacity for momentum in the piston of the steam engine. It takes a certain amount of power, at the beginning of the stroke, to put the piston in motion, on account of the resistance of its inertia, but this power is given off to the fly-wheel toward the end of the stroke, minus the friction, so that nothing is gained or lost but the power required to overcome the friction. Now, all the arguments and calculations designed to show that the momentum of the piston is a source of gain, could be applied to my sub-reservoir to prove that it increases, the flow of water.

Mr. CHARLES B. BOYLE illustrated upon the black-board the problem of falling bodies, in connection with the motion of the piston of a steam-engine. The first application of the law of falling bodies by NEWTON was to the motion of the moon. It is assumed that in the motion of the moon in its orbit, the first impulse of motion would be in a straight line. That is a mere idea which cannot be proved. We merely accept it on faith. The attraction of gravitation drawing the moon into the circle, draws it down by an amount equal to the versed sine of the arc ; and so the motion of the piston of the steam-engine agrees with the versed sine of the arc of the motion of the crank, and gives us exactly the column of figures which Mr. PORTER's article contains. Now, in obtaining the amount of depression in small arcs, the process is to square the distance and divide by the diameter of the circle. The engineer, in levelling, divides by the diameter of the earth ; and in case of the moon we divide by the diameter of the moon's orbit. Now the crank of a steam-engine, moving in equal continuous motion, describes equal spaces in equal times, and consequently divides the periphery of the circle into equal parts in equal times, while the piston moves through the diameter with a motion varying according to the versed sine ; and that is the entire connection of the motion of falling bodies with this subject. This is simply a question of the properties of a circle, independent of motion. Mr. BOYLE concluded with an illustration of the laws of falling bodies, by exhibiting a leaden and cork ball of equal size, and therefore equally resisted by the atmosphere, connected by a wire. Letting them fall to the floor, both strike the floor apparently together ; but letting them fall from an altitude of thirty feet or more, the leaden ball invariably strikes first.

Mr. CHARLES T. PORTER said : In any steam-engine, at the middle of the stroke, the reciprocating parts have attained a certain velocity. They have attained that velocity in traversing one-half the stroke. By a very simple calculation we ascertain what force, constantly exerted, will be required to impart to a mass moving through that distance the velocity actually attained. Although the motion is in a horizontal direction, the acceleration is precisely of the same kind as in vertical motion. Hence, by referring to the law of falling bodies, we see that a simple parallelogram will represent that constantly accelerating force. If the accelerating force were uniform during half the stroke, the retarding force must be uniform during the other half of the stroke. But we find that the accelerating force at the commencement of the stroke is doubled, and that at the middle of the stroke it is nothing at all. That is what I asserted, and what the figures I presented proved ; and I apprehend that no man, when he comes to understand it, can possibly question it.

Mr. VAN DER WEYDE—That is on the supposition that the fly-wheel moves uniformly.

Mr. PORTER—Yes, sir.

Mr. VAN DER WEYDE—Suppose you have not a fly-wheel, but you let the steam push on the piston and turn the crank. Will it not come to a dead stop at the centre point?

Mr. PORTER—Without a fly-wheel, the engines would stop at the dead centres, and would not be carried past.

Mr. VAN DER WEYDE—Then does it not depend on the uni form motion of the wheel?

Mr. PORTER—Yes, it does. But if the piston is obliged to move with that velocity, it must have that accelerating force, no matter whether it is guided by the steam or by a fly-wheel. If it comes to a stop, it does not have that accelerating force applied to it.

Mr. VAN DER WEYDE—There is no acceleration in the circumference of a circle. If the fly-wheel moves unifcrmly, you can easily calculate the motion of the piston from the versed sines of the angles ; so that it is a property of the circle, as Mr. BOYLE attempted to prove.

Mr. PORTER—The table of versed sines will show the nature of the acceleration.

Mr. VAN DER WEYDE—That has nothing to do with the steam-engine.

Mr. PORTER—I think it has everything to do with the steam-engine.

Mr. VAN DER WEYDE—It is a general property.

Mr. PORTER—If the motion of the piston is controlled by a crank, there is a rotary motion controlling the reciprocating motion of the piston. The action is entirely dependent on the rotary motion. The table of versed sines therefore shows the nature of the acceleration of a piston controlled by a crank supposed to be moving uniformly. That is the simple fact I endeavored to state ; and I do not think it can be questioned, although persons may laugh and amuse themselves any way they please.

Mr. BLANCHARD—Don't you state that the acceleration is absolutely the greatest in the centre?

Mr. PORTER—Yes, sir.

Mr. BLANCHARD—Then it is the greatest when the piston stands perfectly still.

Mr. PORTER—If the gentleman will oblige me by calling at my works in Harlem, I will show him a little engine with the braces of the connecting-rod quite loose. Start the engine, and it will go very hard. At full speed the engine runs in perfect silence, showing that a crank passes the centre under a strain, a centrifugal strain from the piston, greater than the force of the steam applied on the other side of the piston that the piston is able to overcome ; demonstrating practically and beautifully that the acceleration is greatest on the dead centre ; not before motion begins to be imparted, but where it begins to be imparted.

Mr. VAN DER WEYDE—The motion of what?

Mr. PORTER—The motion of the piston.

Mr. VAN DER WEYDE—The piston stands still.

Mr. PORTER—The piston has gained a certain velocity at the middle of the stroke, by continual acceleration. That acceleration must have a beginning, and the demonstration is that when it begins, at that precise point, the acceleration is greatest, and that it gradually diminishes until at the middle of the stroke there is no acceleration, and it then passes into retardation.

In conversation with Prof. BARNARD upon this subject, he made use of a beautiful illustration of the insensible manner in which the rotary motion of the crank becomes, through the connecting rod, transformed into reciprocating motion in the piston. Every point in the connecting-rod describes an ellipse, more and more elongated as we approach the piston, until it finally passes into a straight line, and we have absolutely rotation in a straight line, which is the motion of the piston.

Mr. VAN DER WEYDE—I was not present at the reading of your paper, but it appears to me that there is a misunderstanding here. The rate of acceleration, it appears to me, may be greater, but the acceleration itself may be less.

Mr. PORTER—As the velocity of the piston becomes greater the ratio of acceleration diminishes.

Mr. VAN DER WEYDE—Certainly.

Mr. BLANCHARD—I understood the gentleman to claim to have made a great discovery ; but what he has stated to-night we all know, and it is like teaching your grandmother to suck eggs to tell it to us. (Laughter.) This paper published in the *Scientific American* makes the distinct statement, that at the dead centre, when the piston is at rest, and its motion not begun, it exerts a force, and the greatest force, at that very point of time. That is the point. If he hauls in his horns about that, I have nothing to say.

Mr. PORTER—I understood Mr. BLANCHARD to say that it is impossible to conceive of force without motion.

Mr. BLANCHARD—Yes ; it is.

Mr. PORTER—Suppose a fly-wheel is rotated with increasing velocity until it bursts asunder. Was there any force exerted by that fly-wheel before it burst?

Mr. BLANCHARD—Certainly. There was motion.

Mr. PORTER—Was there any rending force—any bursting force?

Mr. BLANCHARD—There was a force manifested by motion ; and without motion a fly-wheel will not burst.

Mr. PORTER—Was there any motion in the direction of the force?

Mr. BLANCHARD—There was motion. The direction of it was bent or modified by the cohesion of the mass.

Mr. VAN DER WEYDE—Every particle was moving in a circle.

Mr. PORTER—Was there motion in the direction of the bursting force?

Mr. VAN DER WEYDE—That is another matter.

Adjourned.

Tyres for Railroad Wheels.

IN an article headed "Steel Tyres," which was copied into the *Engineering and Mining Journal* a short time since, the writer attributes a considerable proportion of the numerous and sometimes disastrous failures of steel tyres upon the driving-wheels of locomotives, to their being made of steel not suited to the purpose for which it is used, in consequence of its too great hardness, which the writer assumes renders it weak. The assumption that if steel is hard it is necessarily weak, is not supported by facts. In a series of experiments upon the strength of materials, it was found that soft steel was broken by a longitudinal strain of 120,000 pounds per square inch ; and that it required 150,000 pounds to break it when it had acquired a razor temper—in this case the hardened steel was much stronger than the soft.

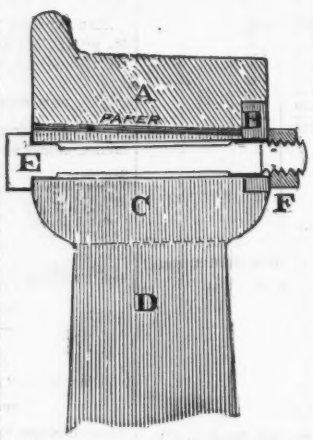
The strength of the article generally depends much more upon the quality of the materials employed, and the mode of working them, than upon its hardness ; and it may be stated as a rule, though not without exceptions, that the softest steel is the weakest.

The cause of the failure of nine-tenths of the steel tyres which occur, and probably a larger proportion, would, if rigidly investigated, be found to be excessive strain produced by too large an allowance for shrinkage when fitting them to the wheels. The writer of the article quoted appears to have been somewhat aware of this source of danger. He says : "Another point also to which we should direct attention is the excessive amount of shrinkage but too frequently given to steel tyres. The shrinkage which it is desirable should be given to a tyre ought to be determined by two things—namely, the elasticity of the material of which the tyre is composed, and the rigidity of the wheel upon which it is placed. We have said that the amount of shrinkage given to a tyre should depend upon its hardness, and the rigidity of the wheel upon which it is placed ; and it is in estimating this latter quantity that the main difficulty in determining the proper shrinkage exists."

Now, if this extra and dangerous strain, produced by excessive shrinkage, can in all cases be avoided, a much larger proportion of the whole strength will remain, and the tyres will not only be much safer but much more serviceable, as they may be worn until much thinner than others without danger of failure.

Some attempts have been made to accomplish this—one of the most successful, perhaps, by G. S. GRIGGS of Massachusetts, who in 1857 obtained a patent for securing tyres upon driving-wheels by dove-tailed wooden blocks, or keys, inserted and tightly driven between the wheel and tyre. This plan, while it relieves the tyres from the unnecessary and dangerous strain generally produced by the shrinking process, imparts to the wheels an amount of elasticity which the patentee asserts has been found to add fifty per cent. to their durability. Notwithstanding the advantages claimed for the new plan it has not been generally adopted, and the old plan of shrinking continues to be the one generally used.

The importance of increasing the safety and durability of the wheels used upon railroads, especially those for locomotives and for passenger cars, induced the writer, some time since, to devise a plan for fixing tyres of steel or wrought iron upon cast iron wheels, which would make them not only more safe and more durable than those in general use, but would, in the long run, be more economical.



The annexed engraving represents a cross section of the rim and tyre of a driving-wheel of a locomotive. In this, A represents the tyre, B a wrought iron ring which fits the recess formed partly in the tyre and partly in the wheel, where it is held by bolts, which pass through the wheel, as shown. The interior of the tyre and the face of the wheel are conical, each being about four-tenths of an inch larger in diameter at the inner edge than at the outer, and the tyre about a quarter of an inch larger in diameter than the wheel ; so that when the tyre is in its proper place there is a space of one-eighth of an inch between them all round, to be filled with paper or leather, or other suitable material.

If paper is used, the kind now manufactured for boat-builders' use, and for covering the roofs and sides of small buildings, may be used, and could be cut to the proper width and curvature, to form bands fitting the wheels, and would perhaps prove to be the best, the most convenient and cheapest article for the purpose to be found.

Some of the advantages of this mode of fitting and securing tyres are supposed to be—first, that they will be safer than others, for reasons already stated ; second, that, in consequence of being slightly elastic, the rails upon which they are used will be more durable than those upon which more rigid wheels are employed ; third, that tyres of this form, when worn or injured, may be replaced with greater facility than those of almost any other form hitherto proposed ; and, fourth, that for the foregoing and sundry other reasons, they will ultimately prove to be cheaper than those now in general use.

The Weather Reports of the Signal Service Corps, U. S. A.

TO THE EDITOR—SIR : The publication of these reports has recently added greatly to our ability for making rational conjectures regarding the changes of the weather. They are read with considerable interest by a great many people, since almost every one has his peculiar ideas on the subject of the weather, and likes to display his sagacity by making predictions. The alphabetical arrangement of the stations in the list published in our daily papers causes, however, considerable confusion in the minds of the weather prophets. For instance, we notice that next to Indianapolis comes Key West ; next to Mobile, Ala., is placed Mt. Washington ; New Orleans and New York, Omaha and Oswego, Rochester, N. Y., and San Francisco, Savannah and St. Louis, are placed next to each other, simply because they, unfortunately, happen to be alphabetically related. In order to obtain an idea of the path of a storm, for example, we must select a certain place and then hunt about till we can find in the alphabetical table some place which we know to be in its vicinity, and then make the requisite comparison of the direction and force of the wind, the height of the barometer, etc. It would certainly be much more convenient for the majority of readers, if the tables as printed in the papers were arranged geographically rather than alphabetically.

NEW YORK, March 1, 1871. WEATHERWISE.

THE ENGINEERING AND MINING JOURNAL.

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ROSSITER W. RAYMOND, Ph. D., Editor.

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The Distribution of Mining Districts.

PROFESSOR W. P. BLAKE, in a note to his Catalogue of California Minerals, pointed out that the mining districts of the Pacific slope are arranged in parallel zones, following the prevailing direction of the mountain ranges. This interesting generalization has been more fully illustrated and connected with the geological history of the country by Mr. CLARENCE KING, whose very suggestive chapter on the subject now lies before us. Mr. KING sums up the observed phenomena as follows:

"The Pacific coast ranges, upon the west, carry quicksilver, tin, and chromic iron. The next belt is that of the Sierra Nevada and Oregon Cascades, which, upon their west slope, bear two zones, a foot-hill chain of copper mines, and a middle line of gold deposits. These gold veins and the resultant placer mines extend far into Alaska, characterized by the occurrence of gold in quartz, by a small amount of that metal which is entangled in iron sulphurets, and by occupying splits in the upturned metamorphic strata of the Jurassic age. Lying to the east of this zone, along the east base of the Sierras, and stretching southward into Mexico, is a chain of silver mines, containing comparatively little base metal, and frequently included in volcanic rocks. Through middle Mexico, Arizona, middle Nevada and central Idaho is another line of silver mines, mineralized with complicated association of the base metals, and more often occurring in older rocks. Through New Mexico, Utah and western Montana lies another zone of argentiferous galena lodes. To the east, again, the New Mexico, Colorado, Wyoming, and Montana gold belt is an extremely well-defined and continuous chain of deposits."

Here, then, are seven longitudinal zones or chains of metalliferous deposits, each of which is held to present a certain degree of individual character throughout its course. The view is a wide and fascinating one; but we fear it is scarcely capable of verification in details. Unless we are much mistaken, Mr. KING will have to recognize more zones, or provide for a greater mineralogical variety in those he has already laid down. Nevertheless, this zonal parallelism does exist, though in a somewhat irregular way; and it is clearly referable, as Mr. KING shows, to the structural peculiarities of the country, the leading feature of which is the longitudinal trend of the mountain ranges.

Subordinated to this trend (or, more strictly, resulting from the same causes as produced it) appear the predominant longitudinal strike of the great outcrops of sedimentary rocks, the longitudinal axes of granite outbursts, and, finally, the longitudinal vents of lava-overflows and the arrangement of volcanoes in similar lines. It is evident that in crossing the country from east to west we traverse a series of different formations, while, by following routes parallel with the main mountain ranges, we travel upon the continuous outcrops of the same general age.

Mr. KING distinguishes in the history of the entire Cordillera two periods of disturbance which have been accompanied by the rending of mountain chains and the ejection of igneous rocks. Such periods would afford the conditions of solfataric action, thermal springs and the generation of acid gases and metallic sublimates and solutions, and thus favor the formation of metalliferous deposits. The first of these periods, he says, culminated in the Jurassic, produced over the entire system a profound disturbance, and is, in all probability, the dating point of a large class of lodes. To the second, or Tertiary period, he assigns the mineral veins which traverse the early volcanic rocks.

The expression "culminated in the Jurassic," merely refers, no doubt, to the fact that the Cretaceous strata of California repose unconformably upon the upturned and metamorphosed Jurassic slates, having been themselves neither tilted nor highly metamorphosed. Perhaps it is well to remember, however, that the Cretaceous is a weak point in the California series, at least, as determined by leading fossils; and perhaps the results of more complete stratigraphical surveys will indicate that there are gaps of no little significance, dynamically and chronologically, in this part of the geological record. At all events, the period of the folding of the Sierra Nevada (presumably that of the formation of many metalliferous deposits) was in some sense post-Jurassic, rather than Jurassic; and probably this is the meaning of Mr. KING, who speaks of it in another passage as "late Jurassic."

The lodes which are referred to this period are of two types: first, those wholly inclosed in the granites, the outburst of which accompanied the upheaval of the earlier stratified group, or in the metamorphosed Jurassic and sub-Jurassic strata; secondly, those which occupy planes of stratification or jointure, thus following in general the dip and strike of the country-rock, while they present in other respects the indications of fissure-veins. The veins of the Reese River granite are examples of the first type; many gold veins of California, the Humboldt mines, etc., are given as illustrations of the second. The White Pine district, the mineral deposits of which are said to be enclosed conformably between strata of Devonian limestone, is declared to be "a prominent example of the groups comprised wholly within the ancient rocks."

We have hitherto supposed the strata immediately overlying the argentiferous limestone at White Pine to be deep-water Carboniferous; but, their Devonian character seems to be demonstrated in the geological chapter on that subject by Mr. ARNOLD HAGUE. More practically important is the assignment of these deposits to the earlier period of geological disturbance. Mr. KING appears here to include in one group *all* the White Pine deposits, the "Base Range" as well as "Treasure Hill;" yet the striking distinction in mineralogical character is worthy of regard. The deposits of Treasure Hill are notably free from base metals; and it seems to us that in their present form they must be due to a secondary action, which has concentrated and recombined the metallic elements of older deposits. It should be added, however, that although the chlorides of Treasure Hill are as pure as those of Lander Hill, they do not appear, like the latter, to yield in depth to such silver ores as characterize the fissure-veins of Reese River district—ruby silver, for instance. Nor are they fissure-veins, so far as we can now decide.

To the Tertiary period of orographical disturbance are referred the volcanic overflows and the veins wholly or partly inclosed in volcanic rocks. Under this head Mr. KING classes many important veins of Mexico, several of those which border the Colorado River, in the United States, and, in general, that zone which lies along the eastern base of the Sierra Nevada. The Comstock lode is adduced as the most prominent example of this type, and the Owyhee district in Idaho is also referred to it, because, although in granite, it presents a series of volcanic dykes which appear to prove, by the manner of their intersections with the quartz lodes, that the latter are of Tertiary origin. It will be seen that although the extent and number of the deposits of this class are inferior to those of the earlier period, they include some of the most brilliant instances in the history of mining. As Mr. KING, however, points out, many of the veins which are wholly inclosed in the older rocks may nevertheless be due to this later period of disturbance. Nor does he ignore the bearing of this thought on his determination of the earlier period as Jurassic. He confesses that in more recent strata, formed from debris of Jurassic rocks, ore-bearing pebbles have not been found; but he regards this fact as a piece of negative evidence merely.

The impression left upon our mind by the whole of this bold generalization is, that it has been carried too far; that the most difficult of all geological chronologies, that of the eruptive rocks, has been too freely handled; and that an interruption of activity throughout the Cretaceous period has been inferred without sufficient proof. But we remember that the evidence is not yet before us, as it is before Mr. KING and his associates; and we await its publication, thanking him in the meantime for a summary of the subject, which is singularly clear and picturesque. We have done it but imperfect justice in this recapitulation of some of its leading points. If Mr. KING's future contributions to the discussion prove as convincing as this one is fascinating, criticism will find little to do but praise.

Petroleum.

EVERYBODY recognizes the importance which this comparatively new article of commerce has of late years attained. But a few years ago the fact that an oily substance was sometimes found floating upon the surface of small streams and ponds in certain localities was known to but few. We can all remember the time when the idea of boring for oil in Pennsylvania was first broached, and also the general excitement and the furor of speculation which were aroused by the announcement of the success of the first enterprises of that nature.

Nevertheless the existence of mineral oil in small quantities has been known for centuries. That old Roman, Pliny, who wrote upon almost every subject, mentions the fact that there existed an oil spring at Agrigentum, in Sicily, from which oil was collected and used for burning in lamps as a substitute for the animal or vegetable oil then commonly employed. On the shores of the Caspian Sea petroleum has long been used for burning in lamps and for fuel. In Burmah there are a large number of wells, from a hundred and eighty to over three hundred feet in depth, some of which still produce oil. In 1833 Professor SILLIMAN described the oil spring of Cuba, Alleghany county, N. Y., as a dirty pool from which a thin film of oil was skimmed off from time to time and used for medicinal purposes. Oil of this kind, then called "Seneca Oil," was even then sold in the shops, but the Professor says that it did not come from this spring, but from a place which has since acquired great notoriety, Oil Creek, Venango county, Pennsylvania. Several wells which were sunk at about that time for salt-brine in Western Virginia, Ohio and Kentucky, yielded small quantities of petroleum. The most productive of these was one near Burksville, Ky., which was bored for salt but struck oil, and for several days yielded at the estimated rate of seventy-five gallons per minute. It was, however, soon exhausted, and further attempts to obtain oil from it or in the same locality proved futile.

At the close of the year 1870, as we learn from an annual review of the petroleum trade in the Titusville *Herald*, there were, in the Pennsylvania oil region, about three thousand productive wells. The production of the United States and Canada was larger during the past year than ever before, and it is estimated reached the immense total of six million five hundred thousand barrels, of forty-three gallons each, against four million seven hundred thousand for 1869 and three million nine hundred thousand for 1868. This shows an increase of nearly two million barrels, or more than thirty per cent. over 1869, while the product for that year showed an increase of 750,000 barrels, or about nineteen per cent. over 1868. Of the total amount produced in 1870 by far the lion's share belongs to Pennsylvania. This region produced 5,659,000 barrels; West Virginia and Ohio 511,000, and Canada 365,000 barrels.

During the year two new and important oil fields have been discovered. They are known as West Hickory and McCray farms. Their development has been extraordinarily rapid, the latter having produced since the first well was bored 323,000 barrels of oil. At the same time the yield of the older tracts has fallen off but little if any. The Parker Landing oil field yielded an average of two thousand barrels per day for the entire year. The prices of oil have fluctuated very much during the year, and in January, 1871, oil sold for nearly a dollar per barrel less than at the corresponding time in 1870. The declaration of war in Europe caused a fall in the price from $4 20 to $3 20 in four days, and on or about the 8th of August oil was sold at the wells for from $2 45 to $2 50, which was the lowest price reached during the year.

During the same period we exported nearly a hundred and fifty million gallons, or about three million three hundred thousand barrels of petroleum, of which nearly three million were refined, two hundred and sixty-eight thousand crude and one hundred and thirty-four thousand barrels of naptha.

The stock of petroleum on hand throughout the world is over one million gallons greater than it was a year ago.

Heat and Power.

NEW YORK, Feb. 28, 1871.

TO THE EDITOR—SIR:—In your issue of Feb. 25 (p. 113), in an article on the Cornish Engine, is the following statement:

"For every 722 foot-pounds, or units of work, done by the steam, one unit of heat disappears, and a quantity of water proportioned to the loss of heat thus produced is formed by condensation in the jacket."

This, I believe, would be accepted as entirely in accordance with the prevailing doctrines of force, and for this reason, and the clear way in which you put it, I would ask a solution, in your popular journal, of some difficulties suggested.

For simplicity of statements, however, let me refer to the same principle as illustrated in any condenser, leaving the Cornish engine jacket aside.

A certain equivalent of steam through the piston produces work, say 722 pounds raised one foot. This raised weight in falling again gives as its equivalent one pound of water raised one degree Fahrenheit; and thus the conservation is maintained, and we have our unit of heat restored, which "disappeared" in raising the piston.

Where did the heat that was in the steam disappear to? If we consult the condenser, we find it there again. One pound of water is raised one degree in temperature, minus some small fractions which are usually attributed to radiation and to absorption by the cylinder and adjacent parts. I have been unable to discover any experimental determination of that fraction of this fraction which theoretically corresponds to the work done by the piston, and yet it ought to be sufficient quantity to be easily found missing in the summing up.

We have, then, by one unit of heat in the steam:—Work done by piston, 772 foot-pounds; work done in elevating the temperature of condensing water, 772 foot-pounds. The latter minus the fraction.

That is to say, two units of work done by one unit of heat. Which is absurd. So much of the heat disappeared into the condensing agent that we find it again almost all there, and yet the piston did a work besides for which there is no equivalent of *lost* heat. Very respectfully yours,

JAMES HARRISON.

Our correspondent's difficulty is a self-imposed one. If a weighted piston should pause at the end of its upward stroke, the heat, say 772 foot-pounds, transformed into motion during that stroke would *not* "appear again in the condenser." Nor would heat thus be restored in sensible form by the fal of the weight, unless the steam were inclosed in the cylinder before the piston, so as to be compressed by the stroke. All the heat that appears in a condenser is heat that has not been transformed into motion at all, except so far as the molecular processes of making steam may be called motion. Our correspondent should say, therefore:—Work done by piston (lifting), 772 foot-pounds; work done in elevating the tempera-

ture of the condensing water, 772 foot-pounds; total heat of steam, 1544 foot-pounds; or two units of heat (fractional losses aside). Now, the force available for other work is that of the weight lifted, as it falls again, or 772 foot-pounds.—ED.

Waterhouse Hawkins.

THE Lyceum of National History, after listening, on Monday evening, the 6th instant, to Mr. HAWKINS's statement of the work he has thus far accomplished in the restoration of the forms of extinct animal species for the museum of the Central Park, passed the following resolutions:

Resolved, That the Lyceum of Natural History in the city of New York has learned with deep regret of the temporary suspension of the work of restoration of the forms of extinct animals, as hitherto prosecuted in the Central Park under the able superintendence of Prof. WATERHOUSE HAWKINS.

Resolved, That the Lyceum considers the proposed palaeozoic museum not only as a valuable acquisition to the scientific treasures and resources of our city, but also as a most important adjunct and complement to our great system of public education.

In these expressions of opinion we heartily concur. Mr. HAWKINS is a man whose services should not be hastily let go. It would be difficult or impossible to find another person equally well qualified for this peculiar scientific work, and we trust that our citizens will not be deprived of the very instructive and interesting collection in which his labors, if allowed to continue, will result.

Polytechnic Club of the American Institute.

Meeting held at the rooms of the Association, Feb. 27, 1871. The President (Prof. S. D. TILLMAN) in the chair.

INVALID BEDSTEAD.

Mr. T. MCILROY exhibited and explained a model of his invalid's bedstead. In heart disease, asthma, consumption and dropsy, we require an elevation of the head; and by turning a handle, we may lift the head to any desired elevation, by raising the upper half of the horizontal frame-work, turning upon an angle at the centre. But this is not usually all that is required, because there will be a tendency for the patient to slip down in the bed. This is counteracted by raising the width of the lower half of the same frame-work at the knee, forming a "double incline," particularly useful for persons troubled with rheumatism, paralysis, or spinal complaint. To accommodate the seat thus provided to the length of the femur of persons of different heights, there is a movable slab at the knee. He also described the use of the same bedstead in cases of fracture, and his appliances for the reduction of fracture, and to prevent the limb from rotating. The lower part of the bedstead may be raised, and a footboard is provided, which may be turned over to serve as a table.

The PRESIDENT stated that he regarded this as a valuable invention, and had lately sent one to a friend residing in Wilmington, N. C., who had inflammatory rheumatism. The bed cost $85.

A NEW FORM OF MAGIC LANTERN.

Prof. MORTON, of the Stevens' Institute at Hoboken, exhibited a new arrangement of the magic lantern, adapted to the exhibition, upon a vertical screen, of horizontal objects, making it possible for large numbers of persons to witness at once phenomena which heretofore it has been impossible to show. The rays from the lime-light pass horizontally through two condensing lenses, then strike a mirror at an angle of 45°, and pass directly up, where they pass through the object, resting immediately upon the last part of the condenser. After passing through the objective, they are again reflected by a mirror at an angle of 45°, and pass horizontally to the screen. Heretofore it has been customary to have the first reflection after the rays leave the condensing lenses, the result being that they make a long cone, and by the time they reach the objective, are not in a fit condition to throw an image on the screen. A square prism will not answer for a reflector, for all the rays will not strike it at such an angle as to be totally reflected, and the consequence will be that one side of the field will be in the shade.

The magic lantern being adjusted, Prof. MORTON illustrated its use. Placing a small magnet upon the condenser, and above it a glass plate, covered with a thin layer of iron filings, by tapping gently upon the glass, the particles were seen to arrange themselves in symmetrical curves around the poles of the magnet. He next showed the motion of the waves. By projecting air through a minute nozzle upon the surface of the water in a circular vessel, the waves were shown to be reflected from the edge of the vessel. Placing the nozzle one side of the centre, the interference of the waves from the opposite sides was shown. Substituting for the circular vessel of water one of elliptical form, the effects of the form was shown, forming various caustic curves, and if the point of impulse was at one focus, showing the meeting of the waves at the opposite focus.

Various cohesion figures were also shown by Prof. MORTON. The oil of coriander being projected in small drops upon the surface of water, they gradually spread and assumed a circular form, any interior openings gradually being filled up. The oil of cinnamon produced a different figure, bubbles forming a fringe around each drop. Creosote, from its solution in the water, formed rapidly moving figures, surrounded with ebullition. A solution of carbonic acid produced a somewhat similar appearance, much resembling vitality. Camphor produced much more rapid motion, some of the particles whirling rapidly. This motion is so much impaired by oil in the water, that even touching the finger to the surface of the water stops the motion. He showed also the cohesion figures formed by alcohol, and by a mixture of chloroform and ether.

A photograph of the magnetic phantom was shown, which was taken from a glass plate covered with a thin layer of shellac, and heated after the iron filings had assumed their regular form, so as to fix their position.

Mr. ROBERT WEIR—Can you throw a photograph upon the wall with this instrument?

Prof. MORTON—Certainly; but there would be no advantage in using the mirror in that case. For such purposes the ordinary form of magic lantern can be used.

Prof. MORTON illustrated by showing a photograph of the late solar eclipse, taken by the American party. The corona and prominences were visible, but the latter, on account of the haze in the atmosphere, produced by the diffusion of their light apparent indentations in the sun's limb, and their form was not well shown.

Mr. WEIR—I see that, during the war, the London *Times* was photographed on small sheets, and sent by carrier pigeons to Paris, where they were illuminated and thrown upon a wall, so that they could be read. How could that be done?

Prof. MORTON—On the principle of the megascope, in which the light is thrown upon an opaque object, and is reflected from it, forming an image upon the screen. It is a photographer's camera turned wrong side out. It would not be useful except for opaque objects. The photographs may have been taken on transparent paper, and then the image formed in the usual way.

The PRESIDENT—Perhaps they were taken on thin paper, which was wet so as to be transparent.

Mr. WEIR—I understood that they were photographed on ordinary paper.

Prof. MORTON—It is very likely that they took a second photograph on glass, and that that was projected upon the screen in the usual way.

Mr. —— Has it been shown by this last eclipse that the light we see around the sun in a total eclipse is reflected light?

Prof. MORTON—That was supposed to be the result at a time when they had heard from only a few of the observers. But some of the American observers—Prof. WINLOCK, YOUNG, and others, were able to observe the green line in the spectrum at the distance of 16° or even 20° from the sun, and this could not have been produced by reflected light. The line in the green which they saw is not in the ordinary sunlight. It is seen in the Aurora, and has been noticed under peculiar conditions in other conical light. It was noticed in the previous eclipse in our own country, by Prof. YOUNG. That showed that there was light which was not a reflection from the earth's atmosphere merely; but that a portion of the light was reflected was proved by the observations with the polariscope, made by Prof. PICKERING and others, which showed that there was light polarised in rays which radiated from the sun's centre, and which was therefore reflected light, and quite likely reflected by the earth's atmosphere. Yet the question is by no means settled by this eclipse. The probability is that it is a composite phenomenon; that a portion of the light is reflected by luminous matter surrounding the sun, another portion by non-luminous matter about the sun, and still another portion by our own atmosphere.

Mr. BLANCHARD read a paper, an abstract of which we give in another column, on the high-piston speed in engines.

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112,313.—HINGE FOR CARRIAGE-DOORS.—G. W. Beers, Bridgeport, Conn.
112,314.—STOVE-LEG.—James Birckhead, Jr., Baltimore, Md.
112,315.—CLOTHES-PIN.—Orris A. Bishop, Chicago, Ill.
112,316.—MANUFACTURE OF ROCHELLE SALTS AND BORAX.—Victor G. Bloede, Brooklyn, N. Y.
112,317.—BEE-HIVE.—Felix Brewer, Waynesville, Mo.
112,318.—THILL-COUPLING.—Theodore Burr, Battle Creek, Mich., assignor to Allen Muir and Henry Muir, same place.
112,319.—EVAPORATING-PAN FOR SACCHARINE LIQUIDS.—Francis C. Butler, Bellows Falls, Vt., assignor to himself and J. B. Williams, Glastonbury, Conn.
112,320.—DOOR-SECURER.—Wm. H. Caldwell, Wheeling, W. Va.
112,321, antedated, March 2, 1871.—TOE-CALK BAR.—Ralph B. Caswell, Springfield, Mass.
112,322.—GLASS-FLATTENING FURNACE AND LEER.—J. Clabby, Lenox, Mass.
112,323.—SPRING BED-BOTTOM.—A. Cole, Manamuskin, N. J.
112,324.—WATER-WHEEL.—Edward E. Coleman, West Cummington, Mass.
112,325.—TOY-HORSE AND CARRIAGE.—John B. Cuzner, Bridgeport, Conn.
112,326.—MACKEREL-LINE HOLDER.—E. L. Decker, Southport, Me.
112,327.—SEWING-MACHINE.—J. W. Dufour, Stratford, Conn.
112,328.—STEAM-BOILER.—E. Evans, North Tonawanda, N. Y.
112,329.—MEDICAL COMPOUND FOR CURE OF CATARRH AND ASTHMA.—Erastus Field, Ostrander, Ohio.
112,330.—MACHINE FOR GRINDING THE CUTTERS OF MOWERS, &c.—Henry Clay Fisk, of Wellsville, N. Y.
112,331.—MACHINE FOR MAKING HOOKS AND EYES.—J. T. Ford, San Francisco, Cal.
112,332.—CHURN.—Thompson Freeman, Westfield, Ill.
112,333.—ATTACHMENT FOR REVOLVING MOLD-BOARDS FOR PLOWS.—Joseph S. Godfrey, Leslie, Mich., assignor to himself and Sears M. Loveridge, Pittsburg, Pa.
112,334.—GRAIN-CLEANER AND FERTILIZER-SIFTER.—J. A. Green, Mill Dale, Va.
112,335.—SCREW-PROPULSION.—Frastus C. Gregg, Trumansburg, N. Y., assignor to Alexander H. Gregg and Chauncy P. Gregg, same place.
112,336.—SEEDING-MACHINE.—P. M. Gundlach, Belleville, Ill.
112,337.—COMPOUND FOR KINDLING FIRES.—J. L. Hannum and Samuel H. Stebbins, Berea, Ohio.
112,338.—LAWN-MOWER.—Benjamin Harnish, Lancaster, and David H. Harnish, Pequea, Pa.
112,339, antedated February 25, 1871.—COMPOSITION FOR PAVEMENTS.—Charles B. Harris, New York, N. Y.
112,340.—SPRING FOR VEHICLES.—J. R. Hiller, Woodland, Cal.
112,341.—HARVESTER-RAKE.—Solomon T. Holly, Rockford, Ill., assignor John P. Manny, same place.
112,342.—DOOR-CLAMP.—Henry O. Hooper, Diamond Springs, Cal.
112,343.—TAPER-HOLDER.—Thomas W. Houchin, Morrisania, N. Y.
112,344.—METALLIC GARTER.—Henry A. House, Bridgeport, Conn.
112,345.—BOBBIN-WINDER.—Henry A. House, Bridgeport, Conn.
112,346.—METHOD OF KNITTING STOCKINGS, &c.—Henry A. House, Bridgeport, Conn.
112,347, antedated March 1, 1871.—APPARATUS FOR EVAPORATING AND CONCENTRATING LIQUIDS.—John Howarth, Salem, Mass.
112,348, antedated March 1, 1871.—APPARATUS FOR EVAPORATING AND CONCENTRATING LIQUIDS.—John Howarth, Salem, Mass.
112,349.—APPARATUS FOR REMOVING OIL FROM VEGETABLE AND OTHER MATTERS.—Elias S. Hutchinson, Baltimore, Md.
112,350.—APPARATUS AND PROCESS FOR REMOVING OIL FROM GRAINS, SEEDS, &c.—Elias S. Hutchinson, Baltimore, Md.
112,351.—CHANDELIER.—Charles F. Jacobsen, New York, N. Y.
112,352.—CULINARY VESSEL.—Carrie Jessup, New Haven, Conn.
112,353.—MACHINE FOR CUTTING LEATHER.—Aberdeen Keith, North Bridgewater, Mass.
112,354.—ATTACHING KNOBS TO THEIR SPINDLES.—John F. Keller and Nathaniel Sehner, Hagerstown, Md.
112,355.—MITER-MACHINE.—Theodore E. King, Boston, Mass.
112,356.—TAKE-UP FOR CORSET LOOMS.—Julius Kutner, New York, N. Y.
112,357.—ELEVATOR AND CARRIER.—Timothy W. Lackore, Worth, Ill.
112,358.—APPARATUS FOR BURNING HYDROCARBON OILS.—James R. Lee, Grass Valley, Cal.
112,359.—BURGLAR-ALARM.—Robert Lee, Cincinnati, Ohio.
112,360.—TELEGRAPH APPARATUS.—Landy Tunstall Lindsey, Jackson, Tenn.
112,361.—HARVESTER.—John Pells Manny, Rockford, Ill.
112,362.—HARVESTER.—John Pells Manny, Rockford, Ill.
112,363.—HARVESTER-RAKE.—John P. Manny, Rockford, Ill.
112,364.—CHEESE-CURD SINK.—Homer C. Markham, Collinsville, N. Y.
112,365.—MOWING-MACHINE.—Homer C. Markham and Dewitt C. Markham, Collinsville, N. Y.
112,366, antedated March 3, 1871.—PROPELLER.—Alexander J. Marshall, Warrenton, Va.
112,367.—OILER.—Edward McDuff and Emory D. Forrow, Warwick, R. I.
112,368.—WASH-BOILER.—John McInnes, Oxford, Pa.
112,369, antedated February 25, 1871.—PROPELLING CANAL BOATS.—Harrison B. Meech, Fort Edward, N. Y.
112,370.—WATER-PROOF COMPOUND FOR COATING CLOTH, WOOD, METALS, &c.—Peter E. Minor, Schenectady, N. Y.
112,371.—COOKING STOVE.—William N. Moore, Neenah, Wis.
112,372.—BORING-MACHINE.—John Henry Pardieck, Acton, Ind., assignor to himself and Samuel M. Brown, same place.
112,373.—VAPOR-BURNER.—Robert W. Park, Philadelphia, Pa.
112,374.—MACHINE FOR POINTING BLANKS FOR CULTIVATOR TEETH.—John Pedder and George Abel, West Pittsburg, Pa.
112,375.—BALE-TIE.—James E. Perkins, San Francisco, Cal.
112,376.—LINING WALLS WITH FELT, &c.—James Phillips, Chicago, Ill.
112,377.—COOKING-STOVE.—Samuel Pierce, Boston, Mass.
112,378, antedated February 25, 1871.—TACK.—Asahel A. Porter, New Haven, Conn.
112,379.—MACHINE FOR SHAPING AND CUTTING GEAR-CUTTERS.—Francis A. Pratt, Hartford, Conn., assignor to "The Pratt & Whitney Company," same place.
112,380.—COMBINATION CAMERA AND DEVELOPING BOX.—Eaneas C. Ratzell, Philadelphia, Pa.
112,381.—PUNCHING-MACHINE.—J. C. Rhodes, South Abington, Mass.
112,382.—WASHING-MACHINE.—John W. Ricker, Chelsea, Mass.
112,383.—CURTAIN FIXTURE.—Charles Robin, Chester, Conn.
112,384.—MACHINE FOR MAKING PRINTERS' LEADS.—Isaac Schoenberg, New York, N. Y.
112,385.—SLIDE-VALVE FOR STEAM RIVETING MACHINES.—Coleman Sellers, Philadelphia, Pa., assignor to William Sellers & Co., same place.
112,386.—MACHINE FOR POLISHING THREAD.—Samuel Semple, Sr., John Semple, Samuel Semple, Jr., and Robert A. Semple, Mount Holly, N. J.
112,387.—PAINT-BRUSH.—Frederick S. Shearer, Washington, Ill.
112,388.—BEE-HIVE.—Samuel Archabald Short, Fredrick Jackson Short, John Bunion Short, and Jasper Kile, Decatur, Ala.
112,389.—APPARATUS FOR REMOVING OIL FROM VEGETABLE AND OTHER MATTER.—Thomas Sim, Baltimore, Md.
112,390.—RETORT FOR PRODUCING BISULPHIDE OF CARBON.—Thomas Sim, Baltimore, Md.
112,391.—UTILIZING THE SILKY DOWN OF THE WILD COTTON.—Michael Hodge Simpson, Boston, Mass.
112,392.—PRUNING SHEARS.—Frank Smiley, Batavia, N. Y.
112,393.—WATER-CLOSET VALVE.—Alfred J. Smith, San Francisco, Cal.
112,394.—GANG PLOW.—James W. Sursa, San Leandro, Cal.
112,395.—GRINDING PAN AND AMALGAMATOR.—William H. Thoss, West Point, Cal.
112,396.—STREET-LANTERN.—Augustus Tufts, Malden, Mass.
112,397.—COOKING STOVE.—Alvin Warren, Swanton, Ohio.
112,398.—SAFETY BRIDLE.—James Weatherhead, San José, Cal.
112,399.—FIRE GRATE.—George Wellhouse, Akron, Ohio.
112,400.—HAY KNIFE.—George F. Weymouth, Dresden, Me.
112,401.—CLAW-BAR.—Charles Winter, Chillicothe, Ohio.
112,402.—STEAM GENERATOR.—John C. Woodhead, Pittsburg, Pa.
112,403.—ANIMAL TRAP.—William D. Wrightson, Queenstown, England.
112,404.—BRUSH.—John Ames, Lansingburg, N. Y.
112,405.—CLOD-FENDER.—Fortune L. Bailey, Freeport, Ind.
112,406.—RULER.—Hugh S. Ball, Spartanburg, S. C.
112,407.—FANNING-MILL.—Benjamin Barney, Time, Ill.
112,408.—ICE-CUTTING MACHINE.—Lafayette Barnum, Bridgeport, Conn., assignor to himself and A. R. Hale, same place.
112,409.—MANUFACTURE OF ICE.—Thomas J. Bigger, Kansas City, Mo.
112,410, antedated February 28, 1871.—MACHINE FOR HEADING BOLTS AND SPIKES.—Reinhold Boeklen, Brooklyn, N. Y., assignor to himself and Henry Torstrick, New York City.
112,411.—WASHING-MACHINE.—Joseph Boswell, Levi M. Boswell, Jonathan Palmer, and Jonathan H. James, Wilmington, Ohio, assignors to themselves and Thomas Starbuck, same place.
112,412.—WATER-WHEEL.—Ellery C. Boyles, New York, N. Y.

112,413.—COTTON-PRESS.—Rhodom M. Brooks, Pike County, Ga.
112,414.—PAPER-CUTTING MACHINE.—Samuel Brown, Philadelphia, Pa., assignor to himself and Cephas R. Carver, same place.
112,415.—GOVERNOR FOR DIRECT-ACTING ENGINES.—Adam S. Cameron, New York, N. Y.
112,416.—GOVERNOR FOR DIRECT-ACTING ENGINES.—Adam S. Cameron, New York, N. Y.
112,417.—BUTT HINGE.—John W. Carleton, New Britain, Conn., assignor to the Union Manufacturing Company, same place.
112,418.—MACHINE FOR CUTTING SHEET METAL.—Charles R. Choate, East Saginaw, Mich.
112,419.—BIT-BRACE.—William Cleveland, Lawrence, Mass., assignor to himself and James Swan, Seymour, Conn.
112,420.—STEAM ENGINE GOVERNOR.—Charles A. Condé, Indianapolis, Ind.
112,421.—CARPET-CLEANING MACHINE.—John Crew Craft, Baltimore, Md., assignor to himself and Antonio Rosello, same place.
112,422.—STEAM REGULATOR FOR PAPER-DRIERS.—Daniel Crosby, Hampden, Me.
112,423.—METALLIC PISTON AND VALVE-ROD PACKING.—George M. Cruickshank, Providence, R. I.
112,424, antedated February 25, 1871.—GRAIN-THRASHING AND SEPARATING MACHINE.—John Culham, Grand Rapids, Mich.
112,425.—COOKING STOVE.—David Curtis, Mishawaka, assignor to himself and C. B. Graham, South Bend, Ind.
112,426.—LIGHTNING ROD.—Sylvanus D. Cushman, New Lebanon, Ohio.
112,427.—HOSE BRIDGE.—Patrick Daily, New York, N. Y., assignor to himself and John J. Kehoe, same place.
112,428.—COVER FOR OPENINGS IN SIDE-WALKS.—William Dale, New York, N. Y.
112,429.—ROTARY PUMP.—Francis Oliver Deschamps, Philadelphia, Pa.
112,430.—MACHINE FOR CUTTING FILES.—James Dodge, Manchester, England, assignor to David Blake, Spencertown, N. Y.
112,431.—COUPLING FOR RAILWAY CARS.—Henry Dibbs and Sampson George Goodall-Copestake, Glasgow, Great Britain.
112,432.—TOBACCO PIPE.—Patrick J. Dwyér, Elizabeth Port, N. J.
112,433.—BASKET FOR HOUSE-PLANTS.—Albert P. Eastman, Washington, D. C.
112,434.—SULKY-PLOW.—M. A. Elliott, Stratford Hollow, N. H.
112,435.—STRETCHER FOR PAINTINGS.—James Fairman, New York, N. Y.
112,436.—BODY LANTERN-HOLDER.—Samuel C. Fessenden, Stamford, Conn.
112,437.—STOVE-LEG.—Amon L. Finch, Sing Sing, N. Y.
112,438.—PUMP-PISTON.—John S. Follansbee and G. Doolittle, Bridgeport, Conn., assignors to the Forrester Manufacturing Company, same place.
112,439.—SHOE.—Samuel W. Francis, Newport, R. I., assignor to himself and William Harrison, Newton, same place.
112,440.—GUARD-FINGER FOR HARVESTERS.—George Fyfe and C. Hard, Ottawa, Ill.
112,441.—DINING-TABLE.—Samuel R. Garner, Independence, Iowa, assignor to himself and S. M. Marquette, same place.
112,442.—STEP-LADDER.—M. Boland Geary, New York, N. Y.
112,443.—OIL-CLOTH PRINTING MACHINERY.—E. A. Goodes, Philadelphia, Pa., assignor to Philadelphia Patent and Novelty Company, same place.
112,444.—TENONING-MACHINE.—Lyman Gould, Norwich, Conn.
112,445.—PRINTER'S CASE.—Wm. H. A. Gresham, Atlanta, Ga.
112,446.—LAMP-CHIMNEY.—G. W. Griswold, Factoryville, Pa.
112,447.—GRAIN-SEPARATOR.—P. Griswold, Hudson, Mich.
112,448.—CLAMP FOR THILL-COUPLINGS.—John W. Guider, St. Joseph, Mo., assignor to himself and John Kiefer, same place.
112,449.—BIRD-CAGE.—Gottlob Gunther, New York, N. Y.
112,450.—STOP-COCK AND VALVE.—Wm. Haas, New York, N. Y.
112,451.—VALVE FOR STEAM-ENGINES.—Joseph L. Harley, Baltimore, Md., and Xaver Fendrich, Georgetown, D. C.
112,452.—METALLIC-HUB.—John H. Harper, Pittsburg, Pa.
112,453.—COMPOSITION FOR LUBRICATING-MACHINERY.—Edmond Q. Henderson, Charlotte, N. C., assignor to John C. Burroughs and R. A. Springs, same place.
112,454.—POST-HOLE DIGGER.—B. B. Herrick, Decatur, Mich.
112,455.—DOOR-CHECK.—Levi S. Hicks, Peoria, Ill., assignor to himself, J. Perrin Johnson and John Buell, same place.
112,456.—RAILWAY-CAR BRAKE.—Luther Hill, Stoneham, and Seth D. Tripp, Lynn, Mass.
112,457.—TRUSS.—Adam Hinoult, Montgomery, N. Y.
112,458.—FEED-BAG FOR HORSES.—Walter A. Hough, South Butler, N. Y.
112,459.—SHADE-HOLDER FOR LAMPS.—Mark Wiggins House, Cleveland, Ohio.
112,460, antedated March, 1, 1871.—LAMP-CHIMNEY.—Mark Wiggins House, Cleveland, Ohio, assignor to the Cleveland Non-Explosive Lamp Company, same place.
112,461.—HORSE-HAY-RAKE.—James Howard and Edward T. Bousfield, Bedford, England.
112,462.—TONGS FOR ROLLING BARRELS.—M. W. Ingle, Indianapolis, Ind.
112,463.—PITMAN.—George W. Jayson, Lodi, Ohio.
112,464.—PASTE FOR PAPER-HANGINGS.—John Jones, New York, N. Y., assignor to himself and Henry A. Smith, same place.
112,465.—TWINE-HOLDER.—Ed. M. Judd, New Haven, Conn.
112,466.—CLOTHES-PIN OR CLASP.—Amos L. Keeports and Wm. Yount, Littlestown, Pa.
112,467.—PUTTING UP HAMS.—Samuel E. Kelley, Philadelphia, Pa.
112,468.—LIME-KILN.—T. A. Kirk, Kansas City, Mo.
112,469.—FASTENING FOR SEATS FOR WAGONS OR SLEIGHS.—J. G. Knapp and John F. Robertson, Warwick, N. Y., assignors of one-third their right to James H. Holly, same place.
112,470.—POTATO-PLANTER.—George Knowlton, Johnstown, Pa., assignor for one-half his right to N. Haynes, same place.
112,471.—REVOLVING FIRE-ARM.—Ed. S. Leaycroft, Brooklyn, N. Y., assignor by mesne assignment, to "Colt's Patent Fire-Arms Manufacturing Company," Hartford, Conn.
112,472.—REVOLVING FIRE-ARM.—Ed. S. Leaycroft, Brooklyn, N. Y., assignor, by mesne assignment, to "Colt's Patent Fire-Arms Manufacturing Company," Hartford, Conn.
112,473.—RAILROAD CATTLE-GUARD GATE.—James H. Mallory, La Porte, Ind.
112,474.—BACK-REFLECTING MIRROR.—Richard Mason, Newark, N. J., assignor to himself and Mathew Ely, same place.
112,475.—VENTILATOR AND CHIMNEY-TOP.—James McGowan, New York, N. Y., assignor to himself and Daniel H. Waring, same place.
112,476.—APPARATUS FOR RECTIFYING AND REFINING SPIRITS.—Frederick Measey, Philadelphia, Pa., assignor to himself and Henry D. Fling, same place.
112,477.—TIN-CAN.—John F. Merrill, Cincinnati, Ohio, assignor to himself and Alexander Stewart, same place.
112,478.—TAKE-UP MECHANISM FOR LOOMS.—John Michna and George Fischer, New York, N. Y.
112,479.—COMBINED BAKER AND BROILER.—Wm. H. Miller, Brandenburg, Ky.
112,480.—SHUTTLE FOR SEWING-MACHINES.—James D. Moore, Grinnell, Iowa.
112,481.—COTTON-CHOPPER AND GRAIN-CULTIVATOR.—D. Mosely, Osark, Arkansas.
112,482.—SAD AND FLUTING-IRON.—Frederick Myers, New York, N. Y.
112,483.—REED FOR ORGANS AND MELODEONS.—Augustus Newell, Chicago, Ill.
112,484.—STRAW-CUTTER.—Amon Park, Germanville, Iowa.
112,485.—APPARATUS FOR AGING WHISKY AND OTHER SPIRITS.—Josiah Peiffer and Samuel Richards, Valonia, Pa.
112,486.—COMBINED COTTON AND CORN-PLANTER.—Louis A. Perrault, Natchez, Miss., assignor to himself and Joseph Huber, same place.
112,487.—FAUCET.—Solomon Pfleger, Reading, assignor to himself and James Shoemaker Pfleger, Tamaqua, Pa.
112,488.—TREADLE.—George K. Proctor, Salem, Mass.
112,489.—LUBRICATING-COMPOUND.—Victory Purdy, Poughkeepsie, N. Y.
112,490.—FERTILIZER AND SEEDING-MACHINE.—A. Putnam, Oswego, N. Y., assignor to Elizabeth Putnam, same place.
112,491.—ROTARY-PUMP.—George W. Putnam, South Glens Falls, N. Y.
112,492.—HAT-BRUSH.—Robert D. Radcliffe, Palmyra, N. Y.
112,493.—REFRIGERATING SHOW-CASE.—Thomas L. Rankin, Lyndon, Kansas, assignor to himself and D. W. Rockwell, Elyria, Ohio.
112,494.—DEVICE FOR STARTING AND STOPPING CARS.—P. Rhoads, Carlisle, Pa.
112,495.—PIPE-MOLDING MACHINE.—G. Richardson, Milwaukee, Wis.
112,496.—SULKY-CULTIVATOR.—R. B. Robbins, Adrian, Mich.
112,497.—HAND-PLOW.—Nelson Rue, Harrodsburg, Ky.
112,498.—MECHANICAL MOVEMENT.—Ed. G. Russell, Ravenna, Ohio.
112,499.—RAILWAY CAR-BRAKE.—Lyman Alphonzo Russell, Shrewsbury, Vt.
112,500.—STOVE-PIPE CLEANER.—David Sanford, Ashton, Ill.
112,501.—TWINE-HOLDER.—Joseph B. Sargent and Purmort Bradford, New Haven, Conn., assignors to Sargent & Co., same place.
112,502.—DOVETAILING-MACHINE.—J. M. Seymour, Newark, N. J.
112,503.—WOODEN-PAVEMENT.—Eaton Shaw, Portland, Me.
112,504.—GUARD FOR CIRCULAR-SAWS.—George W. Shipman, Ischua, N. Y.
112,505.—BREECH-LOADING FIRE-ARM.—Dexter Smith and M. J. Chamberlin, Springfield, Mass.
112,506.—SPARK-ARRESTER.—James Smith, Altoona, Pa.
112,507.—HORSE HAY-RAKE.—S. P. Smith, Waterford, N. Y.
112,508.—PLOW.—S. M. Stewart, New Harrisburg, Ohio.
112,509.—MEDICAL COMPOUND FOR TREATING FEVER AND AGUE.—George E. Swan, Mount Vernon, Ohio.
112,510.—DEVICE FOR COOLING JOURNALS OF CAR-AXLES.—Henry G. Thompson, Milford, Conn.
112,511.—COOLING JOURNAL OF CAR-AXLES.—H. G. Thompson, Milford, Conn.
112,512.—COOLING JOURNAL OF CAR-WHEEL AXLES.—Henry G. Thompson, Milford, Conn.
112,513.—DEVICE FOR COOLING JOURNALS OF RAILWAY-CARS.—H. G. Thompson, Milford, Conn.
112,514.—NON-HEATING HANDLE FOR SAD-IRONS, &c.—William H. Towers, Boston, Mass.
112,515.—LUBRICATOR.—John Ernst Uhl, Renovo, Pa.
112,516.—COMBINED CORN-PLANTER AND CULTIVATOR.—F. Underwood, South Rutland, N. Y.
112,517.—KING-BOLT.—Wendel Vondersaar, Indianapolis, Ind.
112,518.—WHEAT-ROASTER.—George W. Waitt, Philadelphia, Pa., assignor to himself and Robert B. Fitts, same place.
112,519.—PLASTER-SOWER.—T. J. West, Alfred Centre, N. Y.
112,520.—TICKET-HOLDER.—Henry Wexel, Providence, R. I.
112,521.—TOBACCO-PRESS.—A. N. Zell, Lancaster, Pa.
112,522, antedated February 25, 1871.—COMBINED BAG-HOLDER AND SCALES.—William Zimmerman, Lebanon, Pa.
112,523.—BREECH-LOADING FIRE-ARM.—J. M. Mason, Washington, D. C.

REISSUES.

4,287.—TREATING FRUITS TO DRY, SACCHARIFY, AND PRESERVE THEM.—Charles Alden, Newburg, assignor of part interest to Alden Fruit-Preserving Company, New York, N. Y.—Patent No. 100,835, dated March 15, 1870; reissue No. 4,911, dated June 7, 1870.
4,288.—DEVICE FOR SECURING PULLEYS TO SHAFTS.—J. H. Buckman, Cincinnati, Ohio, assignor to himself and Peter W. Reinshagen, same place.—Patent No. 98,144, dated December 31, 1869.
4,289.—SHAWL-STRAP.—G. Crouch, Westport, Conn.—Patent No. 82,606, dated September 29, 1868,
4,290.—ATMOSPHERIC DENTAL-PLATE.—N. T. Folsom, Laconia, N. H.—Patent No. 80,871, dated January 1, 1867.
4,291.—PESSARY.—Wm. R. Gardner, Leonardsville, N. Y.—Patent No. 105,191, dated July 12, 1870.
4,292.—Division A.—SKATE.—J. L. Plimpton, New York, N. Y.—Patent No. 37,305, dated January 6, 1863; reissue No. 3,996, dated April 5, 1870.
4,293.—Division B.—SKATE.—J. L. Plimpton, New York, N. Y.—Patent No. 37,505, dated January 6, 1863; reissue No. 3,906, dated April 5, 1870.
4,294.—APPARATUS FOR PITCHING BARRELS.—L. Schulze, Baltimore, Md.—Patent No. 106,264, dated August 30, 1870.

DESIGNS.

4,694.—PICTURE-FRAME.—John H. Bellamy, Charlestown, Mass.
4,695.—BELL-CRANK AND ESCUTCHEON.—Pietro Cinquini, West Meriden, Conn., assignor to Parker & Whipple Company.
4,696.—PEDESTAL FOR A CAKE-DISH.—G. Gill, Taunton, Mass., assignor to Reed & Barton, same place.
4,697.—TABLE-CASTER.—Wm. Parkin, Taunton, Mass., assignor to Reed & Barton, same place.
4,698.—BUCKLE-FRAME.—J. E. Smith, Waterbury, Conn.
4,699.—BACK OF A CHAIR OR SOFA.—George Unverzagt, Philadelphia, Pa.

TRADE-MARKS.

182.—HAT.—N. A. Baldwin, Milford, Conn., J. H. Prentice, Brooklyn, and John R. Waller, New York, N. Y.
183.—SPOOL-COTTON.—Louis Coleman & Co., Boston, Mass.
184.—SALVE.—Robert Dobbins, Binghamton, N. Y.
185.—SOAP.—Leberman & Co., Philadelphia, Pa.
186.—MEDICINE.—Ridenour, Coblentz & Co., Springfield, Ohio.
187.—PAPER.—Union Manufacturing Company, Springfield, Mass.

EXTENSIONS.

EDGAR HUDSON, of Ithaca, N. Y.—Letters Patent No. 16,648, dated February 17, 1857; reissue No. 2,500, dated March 5, 1867.
SAMUEL R. WILMOT, of Bridgeport, Conn.—Letters Patent No. 16,668, dated February 17, 1857.
JOHN DAVID BROWNE, of Cincinnati, Ohio.—Letters Patent No. 16,678, dated February 24, 1857.
CALVIN ADAMS, of Pittsburg, Pa.—Letters Patent No. 16,676, dated February 24, 1857.
DAVID A. WOODWARD, of Baltimore, Md.—Letters Patent No. 16,700, dated February 24, 1857; reissue No. 2,311, dated July 10, 1866,
JOHN BENEDICT, of Kedosha, Wis., administrator of ANDREW LEONARD, deceased.—Letters Patent No. 16,688, dated February 24, 1857; reissue No. 575, dated July 27, 1858; reissue No. 1,229, dated October 8, 1861.
JOHN BENEDICT, of Kenosha, Wis., administrator of ANDREW LEONARD, deceased.—Letters Patent No. 16,688, dated February 25, 1857; reissue No. 575, dated July 27, 1858; reissue No. 1,228, dated October 8, 1861.
WILLIAM CLEVELAND HICKS, of Summit, N. J.—Letters Patent No. 16,797, dated March 10, 1857; reissue No. 1,952, dated May 9, 1865; reissue No. 3,798, dated January 18, 1870; reissue No. 3,860, dated March 1, 1870.
LEWIS B. MYERS and HENRY A. MYERS, of Elmore, Ohio.—Letters Patent No. 16,772, dated March 3, 1857.

DISCLAIMER.

DAVID A. WOODWARD, of Baltimore, Md.—Letters Patent No. 16,700, dated Febrnary 24, 1857; reissue No. 2,311, dated July 10, 1866,—Filed February 23, 1871.

BUSINESS AND PERSONAL.

[Short notices in this column fifty cents per line each insertion.]

GLYNN'S ANTI-INCRUSTATOR FOR STEAM BOILERS.—THE only and reliable article for removing and preventing incrustation. No foaming, and does not attack metals of boiler. Liberal terms to agents. C. D. FREDRICKS, 587 Broadway, N. Y.
April 19 tf

IMPORTANT TO INVENTORS.

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CHARLES ROGERS, Solicitor and Manager.

In connection with the publication of the ENGINEERING and MINING JOURNAL and the MANUFACTURER AND BUILDER, we have frequently received applications from subscribers and patrons to act as their agents in transacting business with the United States Patent Office; and in view of the increasing number and urgency of such requests, we have resolved to add this department to our business. We have accordingly organized

A COMPLETE PATENT AGENCY,

and now offer our services in procuring patents in this and foreign countries, and transacting all business relating to the obtaining of patents.

Being possessed of superior facilities, in connection with our associate attorneys in Washington and foreign countries, for the successful prosecution of this business, we do not hesitate to guarantee satisfaction to all who may entrust their business to our care.

We have engaged as solicitor and manager Mr. CHARLES ROGERS, a well-known expert in this department. Being a practical mechanic, and having been an examiner in the Patent Office at Washington for a number of years, besides enjoying an experience of more than twenty years as a solicitor of patents, Mr. ROGERS is intimately acquainted with all the details of the business, both in and out of the office.

The specifications, drawings, etc., prepared in our office, will be found to compare favorably with those prepared by any other establishment, while the intimate acquaintance of our manager with the routine of business in the Patent Office, gives us a decided advantage in managing difficult cases.

We are fully prepared to prosecute Rejected Cases and Cases in Interference and Infringements, and also to procure Reissues and Extensions of Patents.

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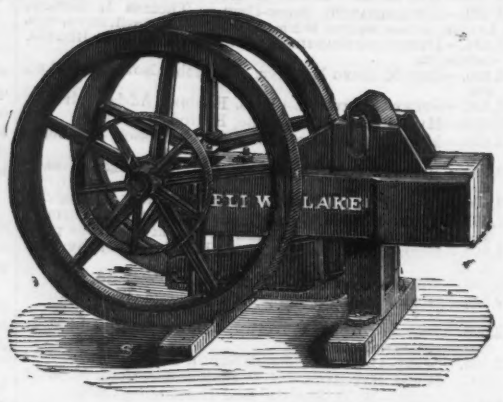

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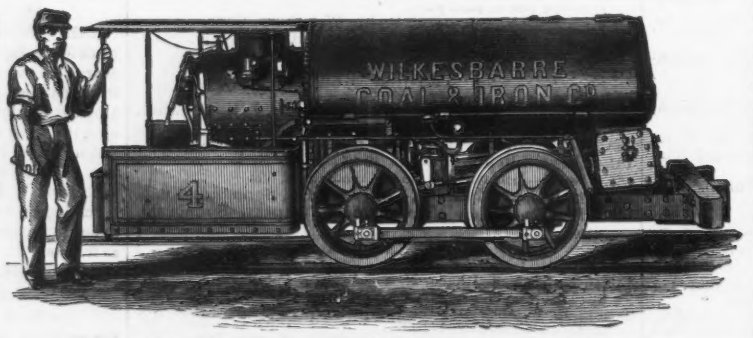

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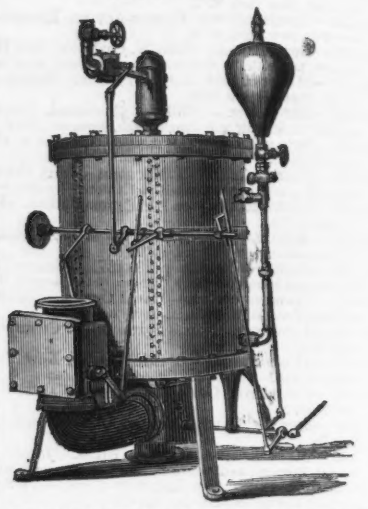

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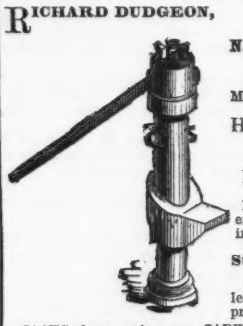

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1871.
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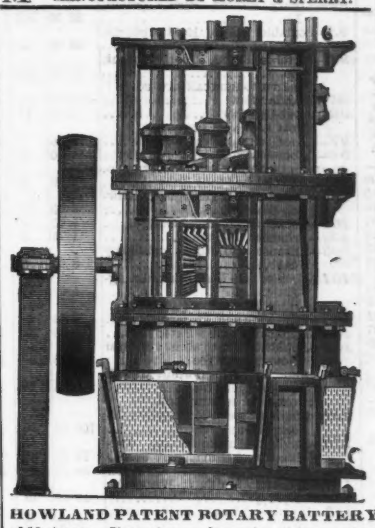

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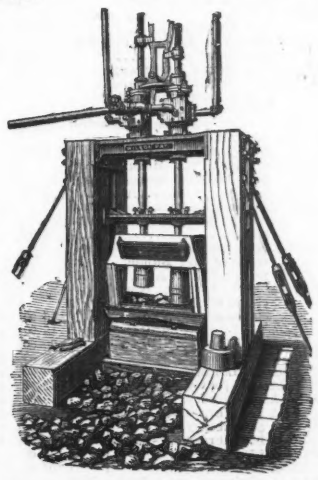

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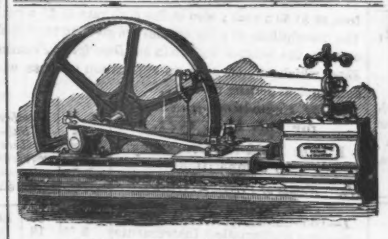

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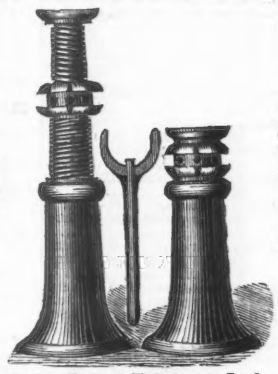

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Ball's Patent Telescope Jack.

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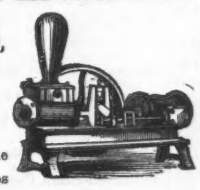
HAND PUMP AND STEAM ENGINE COMBINED.



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MANUFACTURERS OF THE
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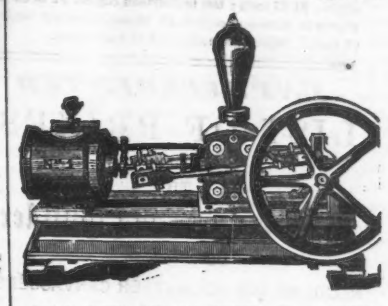

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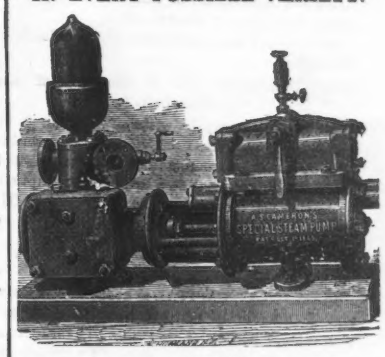

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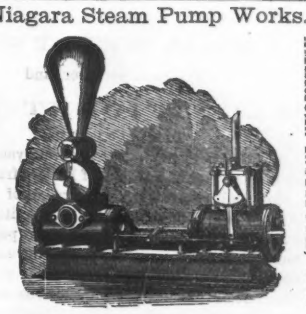

AMERICAN INSTITUTE, 1867.

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OUR PLAN FOR

1871

IS

CAPITAL WITHOUT STINT

For these purposes, and

MAGNIFICENT PAY

To all who help us.

We desire to pay out the coming year not less than a Quarter of a Million of Dollars from our receipts and reserves, for the services of Volunteer Agents alone, in all the States, Territories, and Provinces of North America. Our paper challenges comparison with the best Journals of Arts and Engineering in the world. It is at the same time one of the cheapest publications ever issued from the press; and to all its attractions we now add a range of Premiums tantamount almost to a free gift of our paper, our labor, our earnings, for the year, for the sake of introducing THE MANUFACTURER AND BUILDER to myriads of readers, whose patronage in future years will recompense our present lavish outlay.

For these premiums are to be not only offered, but **paid**; not only paid, but paid **promptly,** to the letter and spirit of the description, and to the satisfaction of all. Every premium is of the best and most desirable kind we can select, and from manufacturers whose names are a guarantee of excellence.

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In the following table is given the price of each article and the number of subscribers required to get it free, at $1 50 a year; also at the club rate of $1 a year. The descriptions of a few articles are given in the fourth column, the balance is given in our *Descriptive Premium Sheet*, which will be sent on application to those who contemplate getting up clubs.

List of Premiums and Terms for Vol. III., 1871.

A Free Field for Everybody. No Competition.

No.	*Names of Premium Articles.*	*Price of Premium.*	*Number of Subscribers required at* $1 50	at $1
	FROM PATTERSON & BROS.			
1—	Tool-Chest	$45 00	60	190
2—	Case Mathematical Instruments	9 00	18	55
3—	Case Mathematical Instruments	15 00	22	75
4—	Pocket Knife	1 50	4	21
5—	Pocket Knife	2 00	5	22
6—	Pocket Knife	2 50	6	25
7—	Lady's Pocket Knife	2 00	5	22
8—	One dozen Knives and Forks	14 00	21	70
9—	One dozen Knives and Forks	18 50	27	90
10—	One dozen Knives and Forks	22 00	33	110
11—	One dozen Knives and Forks	25 50	39	124
12—	Carver and Fork	5 00	13	37
13—	Fluted Sharpening Steel	2 50	6	25
	FROM HALL, ELTON & CO.'S PLATE.			
14—	One dozen Tea-spoons, medallion	5 75	14	40
15—	One dozen Table-spoons, medallion	12 00	19	65
16—	One dozen Table Forks, medallion	12 00	19	65
17—	Butter-Knife, medallion, solid	1 00	4	
18—	Soup-Ladle, medallion	5 75	14	40
19—	Ice or Water-Pitcher, No. 3	17 00	26	80
20—	Pocket Fruit-Knife, No. 12	2 00	5	22
21—	Revolving Butter-Cooler, No. 80.	8 00	16	52
22—	Cake-Basket, No. 1867	10 00	18	58
23—	Caster, 6 bottles, chased, No. 2039	9 25	18	54
24—	Fruit-Basket, No. 200	13 50	21	75
25—	Child's Cup, No. 041	2 75	6	25
26—	Knife, Fork, and Spoon, child's set, morocco case	3 00	8	30
27—	One dozen Napkin-Rings, medallion	9 00	17	54
28—	Tea Set, gold lined, No. 1822	48 00	52	180
29—	Tea Set, No. 1866	36 00	45	135
	FROM COLBY BROS. & CO.			
30—	Knife-Cleaner	75	2	
	FROM MABIE, TODD & CO.			
31—	Gold Pen and Pencil, rubber case	8 00	15	45
32—	Gold Pen and Pencil, rubber case	6 75	13	37
33—	Gold Pen, silver or gold holder, in box	4 25	9	32
34—	Gold Pen, extension gold case, in box	20 00	29	90
35—	Lady's Gold Pen, ivory holder, in box	2 75	6	25
	FROM HENRY RUSSELL & CO.			
36—	Downer Mineral Oil Lamp, No. 1956	4 75	10	35
37—	Downer Mineral Oil Lamp, No. 1956	9 25	17	56
	FROM C. F. A. HEINRICH.			
38—	St. Germain Student Lamp, largest size	8 25	15	45
	FROM FAIRBANKS & CO.			
39—	Family Scales	14 00	21	70
	FROM COLBY BROS. & CO.			
40—	Clothes-Wringer	7 50	10	35
	FROM ALEXANDER M. LESLEY.			
41—	Refrigerator, the Zero, No. 38	38 00	42	142
42—	Cooler, the Newport, No. 1	12 00	15	45
43—	Hot-Air Coal Furnace, the Gothic, No. 9	125 00	135	450
44—	Hot-Air Wood Furnace, Gothic, No. 10	150 00	162	525
	FROM THE STANLEY RULE & LEVEL CO.			
45—	Iron Smoothing-Plane, Bailey's patent	5 00	13	37
46—	Iron Smoothing-Plane, Bailey's patent	6 50	14	42
47—	Iron Jack-Plane, Bailey's patent	7 50	15	47
48—	Iron Fore-Plane, Bailey's patent	9 00	17	55
49—	Iron Jointer-Plane, Bailey's patent	10 00	18	58
50—	Wood Smoothing-Plane, Bailey's patent	3 00	8	30
51—	Wood Fore-plane, Bailey's patent	4 50	10	35
52—	Wood Jointer-Plane, Bailey's patent	4 75	12	36
53—	Wood Jointer-Plane, Bailey's patent	5 50	14	40
	FROM POST & GODDARD.			
54—	Machinists' Hand-Taps	17 60	25	75
55—	Machinists' Hand-Taps	52 80	65	220
56—	Machinists' Hand-Taps (your choice)			
57—	Screw-Plates and Dies, size A	5 00	12	37
58—	Screw-Plates and Dies, size B	8 00	15	45
59—	Screw-Plates and Dies, size C	10 00	18	58
60—	Screw-Plates and Dies, size D	13 00	20	70
61—	Tap-Wrenches, size A	3 00	7	25
62—	Tap-Wrenches, size B	4 00	9	30
63—	Tap-Wrenches, size C	5 00	12	37
64—	Set of 11 Taper Shank-Twist Drills, No. 1	19 75	29	90
65—	Set of 29 Drills, straight shank, mounted, No. 9	12 00	18	60
66—	Set of 60 Drills, steel wire gauge from 1 to 60, No. 12	8 00	15	45
67—	Set of 21 Taper-Shank Drills, No. 3	44 00	58	175
68—	Set of 9 Bit-Stock Drills, 1-16 to ½ in.	2 80	6	25
69—	Self-Centering Drill-Chucks, Beach's patent, for jewelers, No. 0	10 00	18	58
70—	Self-Centering Drill-Chucks, Beach's patent, for drilling, No. 0	7 00	14	40
71—	Self-Centering Drill-Chucks, Beach's patent, 0 to 3-16, No. 1	6 00	13	38
72—	Self-Centering Drill-Chucks, Beach's patent, 1 to 60 S. W. E., No. IX	7 00	14	40
73—	Self-Centering Drill-Chucks, Beach's patent, 0 to ½, No. 3.	14 00	23	77
74—	Drill-Grinding Machine, No. 1	10 00	18	58
75—	Drill-Grinding Machine, No. 2	20 00	30	95
76—	Auger-Bits, your choice of 4 sets	— —	—	—
	FROM L. W. POND.			
77—	Foot-Lathe, No. 1	50 00	65	204
78—	Foot-Lathe, No. 2	30 90	47	124
	FROM COLBY BROS. & CO.			
79—	Miniature Steam-Engine and Boiler	1 36	5	23
	FROM RUSSELL & SPEIR.			
80—	Steam-Engine (1 H. P.) and Boiler	300 00	310	1125
81—	Steam-Engine (3 H. P.) and Boiler	600 00	640	3250
82—	Steam-Engine (5 H. P.) and Boiler	800 00	858	3000
83—	Steam-Engine (10 H. P.) and Boiler	1200 00	1285	4500
84—	Steam-Pump, C. B. Hardick's, No. 0	120 00	155	540
85—	Steam-Pump, Cameron & Co.'s, No. 1	150 00	192	675
86—	Steam-Pump, Cameron & Co.'s, No. 2	200 00	257	900
87—	American Submerged Pump	12 00	19	65
	FROM GEORGE TALLCOT.			
88—	Turbine Water-Wheel, Reynold's, 12 in.	105 00	125	360
89—	Turbine Water-Wheel, Reynold's, 24 in.	226 50	270	800
90—	Turbine Water-Wheel, Reynold's, 36 in.	334 50	460	1350
91—	Rotary Blower, Root's patent No. 1	$50 00	70	275
92—	Rotary Blower, Root's patent, No. 2	80 00	105	420
93—	Portable Forge, Root's patent, No. 1	48 00	65	260
94—	Portable Forge, Root's patent, No. 3	80 00	105	420
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97—	Labor-Saving Vise, 2-in. jaw	4 00	9	32
98—	Labor-Saving Vise, 4½-in. jaw	12 00	28	58
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100—	Silver-Plated Triangular Drawing-Scale	6 00	16	52
101—	Pocket Sheet-Metal Gauge	5 00	13	37
102—	Arkansas Oil-Stone	1 75	5	22
103—	Arkansas Oil-Stone, mahogany case	3 25	8	30
104—	Gear or Cog-Wheel Calculating-Rule	4 00	12	36
	WESTERN & COMPANY'S AGENCY.			
105—	Preparing and Filing a Caveat	25 00	28	80
106—	Application for a Patent	30to40	35	100
107—	Application for Patent and first Government fee	46to56	50	150
108—	Application for Patent and all Government fees	66to76	75	250
	FROM J. W. HUTCHINSON.			
109—	English Breech-loading double-barrel Gun	100 00	110	350
110—	English Muzzle-loading double-barrel Gun	75 00	85	250
111—	Breech-loading Rifle, the Allen	30 00	46	150
112—	Revolver, Smith & Wesson's, No. 1½	12 50	19	65
113—	Revolver, Smith & Wesson's, No. 2	15 00	22	75
	FROM MASON & HAMLIN.			
114—	Melodeon, portable, No. 1, 4 octave	50 00	66	200
115—	Melodeon, resonant, style G, 5 octave	170 00	146	510
116—	Pipe-Organ, church use, style No. 29	675 00	579	2000
	FROM J. S. & C. ODELL.			
117—	Pipe-Organ	500 00	430	1500
118—	Pipe-Organ	700 00	600	2100
119—	Bradbury Square Piano-Forte, No. 4	650 00	430	1500
120—	Steinway's No. 1 Grand Piano	1200 00	860	3000
	THE AMERICAN WATCH CO., WALTHAM, MASS.			
121—	Silver Watch	20 00	32	100
122—	Silver Watch	35 50	48	142
123—	Gold Watch	50 00	65	200
124—	Lady's Gold Watch	100 00	110	350
	FROM THE UNITED STATES WATCH CO.			
125—	Silver Watch	40 00	50	150
126—	Silver Watch	66 00	75	275
127—	Gold Watch	100 00	100	300
128—	Silver Watch	104 00	104	312
129—	A Sewing Machine (your choice)	65 00	65	200
	FROM MCALLISTER.			
130—	Microscope and 48 objects	10 00	14	40
	FROM COLBY BROS. & CO.			
131—	Velocipede for Boys	16 00	16	52
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132—	Magic-Lantern, No. 433	20 00	30	95
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133—	An Easy Chair			
	FROM D. APPLETON & CO.			
134—	New American Cyclopædia, 16 vols	80 00	80	213
	FROM G. & C. MERRIAM.			
135—	Webster's Unabridged Pictorial Dictionary	12 00	15	45
136—	Webster's National Pictorial Dictionary	6 00	10	35
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137—	One back vol. Manufacturer and Builder, unbound, post-paid	1 75	6	25
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142—	A $10 Library (your choice from list in special sheet),	10 00	18	58
143—	A $15 Library,	15 00	24	85
144—	A $20 Library,	20 00	31	106
145—	A $25 Library,	25 00	38	125
146—	A $30 Library,	30 00	44	144
147—	A $35 Library,	35 00	50	162
148—	A $40 Library,	40 00	56	177
149—	A $45 Library,	45 00	62	192
150—	A $50 Library,	50 00	68	207
151—	A $60 Library,	60 00	80	237
152—	A $75 Library,	75 00	100	282
153—	A $100 Library,	100 00	125	360

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154—A choice of good Books (see terms in another column)

155—A choice of convenient Book-Cases (see special sheet)

156—A choice of popular Music (see terms in special sheet)

157—A choice of Games and Toys, (see terms in special sheet)

We have taken especial pains to select in making up our price list the NEWEST and very BEST articles. No charge will be made for boxing or packing any article on our list. The Premiums, Nos. **4** to **7** inclusive, **31** to **35** inclusive, **79, 99, 101, 105** to **108** inclusive, **121** to **128** inclusive, **137** to **141** inclusive, **154, 156, 157,** will each be delivered FREE of charge by mail or express (at the Post-office or express office nearest recipient) to any place in the United States or Territories. The other articles cost the recipient only the freight after leaving the manufactory of each, by any conveyance specified.

As an aid to those who engage upon large clubs, we will count subscriptions by *one* individual for 1869, 1870, and 1871, as *three* subscribers toward a premium. Every *new* subscriber should have the work from the beginning. Bound volumes may be counted in the same way—each as one subscriber—except, of course, when they are obtained as a premium.

Do not fail to note the following Points:

1. All subscribers sent by one person count, though from one or a dozen different post-offices. But

2. State with each name or list of names sent that it is for a premium.

3. Send the names as fast as obtained, that the subscribers may begin to receive the paper at once. You can have any time, from one to six months, to fill up your list.

4. Send the exact money with each list of names, so that there may be no confusion of money accounts.

5. Old and new subscribers all count in premium clubs, but a portion, at least, should be new names; it is partly to get these that we offer premiums to canvassers.

6. Specimen numbers, cards, and show-bills will be supplied free, as needed by canvassers; but they should be used carefully and economically, as they are very costly.

7. Remit money in Checks on New York banks or bankers, payable to order of WESTERN & COMPANY, or send Post-Office Money Orders. If neither of these is obtainable, Register Money Letters, affixing stamps both for the postage and registry; put in the money and seal the letter in the presence of the postmaster, and take his receipt for it. Money sent in any of the above ways is at our risk.

DESCRIPTIVE LIST OF PREMIUMS.

Every Premium in the annexed list is described in the December MANUFACTURER AND BUILDER, *and also in a* **Special Descriptive Sheet,** *which will be sent* **free** *to every one desiring it. We have room here for the following only:*

No. 1—Chest of Good Tools.—We are able, through the special favor of Messrs. Patterson Brothers, of 27 Park Row, to offer chests of the very finest quality of tools, of kinds and prices named below. Similar tools could be purchased for half the money; but these are all A No. 1, for practical use, and worth a dozen common articles. For this we have the guaranof Messrs. Patterson, which is amply sufficient for us, and for all who know them. Any of these tools may be ordered of them. We make up only a single premium, which contains a full assortment for all common purposes. The tools are of regular size, and but few additions would be required for a journeyman carpenter. The assortment we offer is as follows: 1 tool-chest, $8; 1 jack-plane, $1 75; 1 smooth-plane, $1 50; 1 fore-plane, $2 25; 1 handsaw, 22 in., $1 75; 1 compass saw, 10 in., 50c.; compass, 6 in., 37c.; 1 adze-eye hammer, No. 4, $1 25; 1 hatchet, No. 2, 90c.; 1 draw-knife, 7 in., $1 12; 1 try-square, 6 in., 70c.; 1 bevel, 8 in., 75c.; 1 chalk-line and spool, 30c.; 1 mallet, 30c.; 1 pair of pliers, (steel,) 5 in., 60c.; 1 pair of calipers, 4 in., 38c.; 1 brace, No. 2, $2 25; 1 auger-bit, ea., ¼ in., 30c.; ½ in., 32c.; ¾ in., 45c.; 1 in., 60c.; 1 centre-bit, ea., ½ in., 21c.; ¾ in., 23c.; 1 in., 25c.; 1¼ in., 35c.; 1½ in., 40c.; 6 gimlet-bits, assorted, 90c.; 3 gimlet-bits, assorted, 33c.; 1 screw-driver bit, 25c.; 1 flat countersink, 25c.; rose, do., 25c.; snail, do,, 25c.; 1 octagon reamer, 30c.; 1 taper-bit, 30c.; 1 screw-driver in handle, ea., 3 in., 30c.; 6 in., 50c.; 1 gouge in handle, ea., ½ in., 50c.; 1 in., 70c.; 1 chisel in handle, ea., ¼ in., 30c.; ½ in., 35c.; ¾ in., 40c.; 1 in., 50c.; 1¼ in., 60c.; 1 framing-chisel, ea., ¾ in., $1; 1 in., $1 10; 1¼ in., $1 20; 1 auger, ea., ¾ in., 70c.; 1 in., 80c.; 1¼ in., 90c.; 1 set bradawls in handles, $1 35; 1 rule, 2 feet, 25c.; 1 saw file, ea., 4 in., 14c.; 5 in., 17c.; 1 flat bastard file, 8 in., 30c.; 1 wood-rasp, 50c.; 1 soldering copper, 60c.; solder nails, etc., $1 25;=**$45 00.**

Nos. 2, 3—Mathematical Instruments for Draughting, Drawing, Etc.—Very convenient not only for architects and mechanics, but for boys and girls. These are neatly fitted in beautiful rose-wood cases, having dividers with flexible joints, and points, semi-circles, pencil and penholders, rulers, etc., etc. All the pieces in No. 2 are finished in brass and steel; those in No. 3 are German-silver and steel. The pieces are the same in each, but No. 3 is of extra beauty and workmanship. 18 subscribers at $1 50 each secures No. 2, and 22 at $1 50 each, No. 3.

Nos. 4, 5, 6, 7—Pocket Knives.—Here's for th boys and girls. These premiums are among the most pleasing and useful that we have ever offered. Every boy, and girl too, wants a pocket knife. We give them an opportunity to obtain a most valuable one for merely a little effort. These knives are from Messrs. Patterson Bros. No. 4 is a neat, substantial knife, with three blades and buck-horn handle. No. 5 is a still finer article, with four blades and buck-horn handle. No. 6 is an elegant knife, with four blades and shell handle. No. 7 is a lady's pocket-knife, a beautiful article, with four blades and shell handle.

Nos. 8, 9, 10, 11, 12, 13—American Table Cutlery.—We are glad to be able to offer really good articles of American manufacture, such as are competing successfully with the best foreign goods. ***Messrs. Patterson Bros., 27 Park Row,*** who supply us with these articles, are also importers of English goods. They recommend these knives, manufactured by the ***Meriden Cutlery Co.,*** as equal to any cutlery in the market, and their recommendation is a guarantee wherever they are known. We offer four kinds knives, and three sizes of each kind. No. 8 have rubber handles, which are actually boiling-water-proof, so that, if they were accidentally to remain in it for several minutes, or even hours, they would not be injured. The blades are of the best steel, and warranted. Dessert size, with forks, sold at $14. For 23 subscribers at $1 50, or 78 at $1, we will give either the medium size or the table size, sold at $15 50. No. 9 have ivory handles, are selected with great care, have steel blades, and are beautiful goods. Dessert size, with forks, sold at $18 50. For 31 subscribers, at $1 50, or 100 at $1, we will send the medium size, sold at $20 50. For 34 at $1 50, or 112 at $1, we will send the table size, sold at $22 50. No. 10 are made of solid steel, and are triple plated all over with pure silver, which will wear for a long time, while the knife is actually indestructible by ordinary use. Dessert size, with forks, sold at $22. For 37 subscribers, at $1 50, or 118 at $1, we will give the medium size, sold at $24 50. For 38 at $1 50, or 120 at $1, we will send the table size, sold at $25. For 38 at $1 50, or 120 at $1, we will send the table size, sold at $25, No. 11 have steel blades, triple-plated with silver, and larger ivory handles, and are really splendid goods. Dessert size, with forks, sold at $25 50. For 42 subscribers, at $1 50, or 128 at $1, we wil give the medium size, sold at $28. For 45 subscribers at $1 50, or 143 at $1, we will give the table size sold at $30 50. The forks, which accompany these premiums, Nos. 8, 9, 10, are made of genuine albata, and warranted double-plated with coin-silver. The forks with No. 11 are warranted triple-plated with coin-silver. These forks are also furnished to us by Messrs. Patterson Bros. The carving-knife and fork, and fluted steel, are made by

PUBLICATIONS.

the Meriden Cutlery Co., with the best ivory balanced handles.

Nos. 105 to 108—To Procure a Patent without Money.—We have met with many having valuable inventions, which inventors are anxious to get patented, but are unable to afford the expense, and consequently fail to secure the profits which a patent might produce. To such as are in this position, we make the following liberal offer: No. **108**—We will prepare an application for a patent, attend to its passage through the Patent Office, and pay all government fees and incidental expenses attending the same, for any inventor presenting a patentable invention, who will get up a club of seventy-five subscribers for THE MANUFACTURER AND BUILDER for one year at $1,50 each, or 250 at $1 each, and send us the money by post-office order. If this application should be rejected, they may send us an additional list of thirty subscribers at $1.50 each, and the subscription money for the same, on receipt of which we will prepare and prosecute a second application, paying all government fees and incidental expenses. No. **107**—For a list of fifty subscribers at $1.50 each, or 150 at $1 each, with the cash accompanying it, we will prepare an application, attend to its passage through the office, and pay the government fee ($15), the applicant paying the second government fee of $20. No. **106**—For a list of thirty-five subscribers at $1.50, sent in the same way, we will prepare and prosecute an application, the applicant paying the government fee. No. **105**—for twenty-eight subscribers at $1.50 each, or eighty at $1 each, we will prepare and file a caveat, furnish the necessary drawings, (which we also furnish in all the above cases), and pay all government fees. All cases placed in our hands under these arrangements will receive our best attention, equally with those for which our fees have been paid in cash, and will be appealed to the Board of Examiners-in-Chief if necessary, the applicant paying the government fee of $10 on such appeal. If the inventor has no model to accompany his application, he may procure additional subscribers, the premium on which (see cash rates) will enable him to pay for the model. A club of 100 names has been obtained in a single establishment where from 150 to 200 hands are employed. A village of 500 inhabitants will take this number readily.

No. 129—Sewing Machines.—Your choice! A $65 machine for 65 subscribers, at $1.50 each.—It makes no difference to us which machine we send, or whether it is selected at first or at the last moment. No charge for boxing the machines; they go safely as freight. For circulars, giving full particulars in regard to style of machines, fixtures, etc., as well as instructions, send to **Grover & Baker Manufacturing Co.,** 495 Broadway, New York; **Florence Sewing Machine Co.,** 505 Broadway, New York; **Wilcox & Gibbs Sewing Machine Co.,** 658 Broadway, New York; **Singer Sewing Machi** 458 Broadway, New York.

Nos. 137, 138—Volumes of the Manufacturer and Builder.—The unbound volumes of THE MANUFACTURER AND BUILDER consist of a set of numbers for a year, each separate in its own paper cover. These volumes amount to a valuable Library on all matters pertaining to the Industrial Arts, and contain more varied information on manufacturing, building, and mechanical subjects than can be obtained in books costing three times as much. The price of the volumes unbound is $1.50 each, at the office, or $1.75 if sent by mail, as they must be post-paid. They are profusely illustrated, the engravings used in them having alone cost thousands of dollars. For ordinary use, the sets of numbers unbound will answer quite well.

Nos. 139, 140—Bound Volumes of the Manufacturer and Builder.—*New* subscribers almost invariably desire to secure the back numbers of THE MANUFACTURER AND BUILDER from its commencement. Some desire them bound in our uniform style, while others prefer to get the loose numbers and have them bound to suit their own tastes. *Our* binding is very neat, and being done in large quantities at one time, is furnished at a *very cheap* rate. It is moreover very handsome, being of cloth, with gilt title and back, sides embossed and ornamented with a neat architectural devise stamped in gold. The price of the volumes is $2.50 each, sent post-paid.

No. 141—Covers for Binding the Manufacturer and Builder.—These are described in premium 139, 140. Now ready for 1869 and 1870. Be careful to state *which year* you require. Any country binder will insert the year's numbers in one of these covers at a moderate cost. Price, 50 cents; sent, *post-paid*, on receipt of three subscribers at $1,50 for each cover.

Nos. 142 to 154—Good Libraries.—In these premiums we offer a choice of books for manufacturers, mechanics, artisans, builders and others. The person entitled to any one of the premiums 142 to 153, may select any books desired from the list published in our Special Premium Sheet, to the amount of the premiums, and the books will be forwarded, post or express paid. $25 or $50 worth of books pertaining to the industrial arts will give the boys new ideas, set them to thinking and observing, and thus enable them to make their heads help their hands. Any good book will, in the end, be of far more value to a youth than to have an extra hundred dollars on coming to manhood. ☞ Let the mechanics of a neighborhood unite their efforts, and through these premiums get an industrial library for general use.

No. 154—General Book Premium.—Any one sending twenty-five or more names may select books from our list to the amount of ten cents for each subscriber sent at $1; or thirty cents for each name sent at $1.20; or sixty cents for each name at $1.50. *This offer is only for clubs of twenty-five or more. The books will be sent by mail or express, prepaid through by us.*

Nos. 14 to 29—Silverware for the Table.—What would become of elegance and refinement in the furnishing of homes if the ladies (God bless them!) had not such an amiable passion for endlessaly beautifying everything around them? Ever since Eve first set out the fruit of Paradise on its broad leaves to entertain the angel guests of Adam, it has been the province of her lovely daughters to spread the social board with attractions still more tempting to the eye than to the palate. What, that becomes a woman, will not a woman do to make her table shine? We condole with them that their means are not always equal to their good taste, and propose that henceforth no lady shall lack a lustrous silver tea-set, or other piece of similar elegance, unless she chooses to. Look at the following premiums, all of the celebrated manufacture of Messrs, HALL, ELTON, & Co., 36 Park Row, New York; No. 28 is silver-plated, gold-lined, beautifully chased **Tea Set** of six pieces, consisting of a coffee-pot, two teapots, a creamer, a sugar-bowl, and a slop-bowl. The style of this set is very neat, new and elegant. Messrs. Hall, Elton & Co, warrant these goods to be their best triple plate. This is a very desirable premium. No. 29 is a tea-set with same number of pieces, triple-plated, plain, new style.

Nos. 31, 33, 33, 34, 35—GOLD PENS, Rubber Mounted with Ever-Pointed Pencils—Pens in Gold and Silver Holders—Pens and Pencils in Extension Cases.—No. 31 has a gold-mounted rubber case, with pencil, and a No. 4 gold pen, manufactured by MABIE, TODD & Co., 180 Broadway, New York. This and the next, No. 32, are, we think, really the best things of the kind manufactured. The fact that hard rubber is used, shows that the gold for the mountings, etc., is of the finest quality, as rubber, on account of the sulphur contained in it, can not be mounted with any other without tarnishing. When closed, the pencil No. 31 is only 5 inches long, (No. 32, 3½ inches,) but it opens to a length of 5¾ inches. The price for the holder and pencil of No. 31 is $6, pen $2; and of No. 32, or smaller size, $5 for the case, and $1 75 for the pen. Fifteen subscribers will give you the former, or gentleman's size, and 13 the latter, or lady's size. No. 33 is a No. 6 gold pen, with silver or gold-plated holder with an ebony handle—a very neat, desirable business-pen. By describing the kind of pen you prefer, we can probably select one that will suit your hand perfectly. We send these by mail, in a neat turkey morocco box, lined with velvet, in which they can be kept, protected from injury, No, 34 is a large pen, in a fine extension case, round or fluted, and richly engraved. The gold is 14 carats fine. These pens, which are nicely put up in boxes, are a very beautiful thing for a present. Price $20, and sent, postage paid, to any address, upon receipt of 29 subscribers at $1 50 each. No. 35 is a lady's gold pen, with ivory holder. Price, $2 75. This is indeed a very neat and beautiful pen for ladies' use. We send it. postpaid, by mail, inclosed in a handsome velvet-lined morocco box, for 6 subscribers.

No. 38—The Celebrated St. Germain or German Student's Lamp.—as it is sometimes called. This lamp is made and furnished to us by C. F. A. HENRICHS. It scarcely needs eulogium, being the standard thing in our leading colleges, both among students and professors. They reject gas, even where it is most plentiful and convenient, and save their much-worked eyes by the motionless pure white light for which this lamp is so remarkable. No other artificial illumination approaches so nearly to the still colorless sunlight. The secret is in the scientific adaptation of burner and chimney to produce that perfection of draught by which absolute combustion is attained without vibration. The porcelain shade softens the light most agreeably. The lamp slides on a vertical standard, and is adjusted by a set-screw at any desirable elevation to accommodate the work or the eyes. The reservoir is elevated above and at a short distance from the burner, (communicating by a pipe,) so that the oil is always cool and out of reach of flame. The reservoir can be taken out of its telescopic socket, and carried away to another room and filled and returned, without putting out the light. The lamp will be a treasure worth no little trouble to obtain to any one who needs strong light, or who values eye-sight, economy, neatness, pure air, and freedom from trouble and annoyance with lamps; as in all these points it is without a peer. The price of these lamps is $8, with 25 cents for packing. The mineral sperm oil can be had from most respectable dealers, or ordered in packages of any size (1 gallon upward) from Messrs. HENRY RUSSELL & Co., 38 Park Place, New-York.

No. 156—Music.—From C. W. HARRIS', 481 Broadway.—Send to him and get a catalogue, which he mails free to any address. From this list select the music desired, at the following rates: We send $5 worth of music for 10 subscribers at $1 50 each; $10 worth of music for a club of 16 subscribers at $1 50 each; $15 worth for a club of 20, and $20 worth for a clu of 30. This gives all who love music a chance to get what they want free, as the music may be distributed among the members of the club,

No. 157—Game and Toy Premium.—Here is another chance for the young folks, who should never be neglected when an opportunity offers for conveying instruction with amusement. The following is a list of games selected from the extensive stock of Messrs. COLBY BROTHERS & Co., No. **508** Broadway, New York. We think our selection admirably adapted to the tastes of young folks. It is a good idea to include one or two of these premiums in connection with a larger one. 1. New Picture Puzzle 25c. 2. Chinese Santa Claus Puzzles, 25c. 3. A Pack of Bible Question Cards, 25c. 4. Illustrated School Cards, 25c. 5. The House that Jack Built, 35c. 6. Little Red Riding Hood, 35c. 7. Where's Johnny? 35c. 8. Cock Robin, 35c. 9. Farmer Frost, 35c. 10. Grandma's Game of Riddles, 35c. 11. Grandma's Arithmetical Game, 35c. 12. Poetical Potpie, 50c. 13. Sam Slick, 50c 14. American Jack Straws, 50c. 15. Grandfather's Games, 50c. 16. Folding Checkerboard, 50c. 17. Checker-Man (fine set) 50c. 18. Checker-men, common, 25c. 19. Dissected Map of Palestine, 75c. 20. Dissected Map of Jerusalem, 75c. 21. Dissected Pictures, 75c. 22. Dissected Manageric School, 75c. 23. Game, Monarch and Thrones, 75. 24. Author's Improved, fine, 75c. 25. Checkered Game of Life, $1. 26. Smashed-up locomotive, $1. 27. Dissected Map of United States, $1. 28. Knights of the Red Cross, $1. 29. Set Parlor Croquet, $1 50. 30. Set Parlor Bowls, $1 50, 31. Parchesi, $1 50. 32. Small Back-Gammon, furnished, $1 50 33 Game of Golden Stars, $1 50. 34 Model Ship Puzzle, $1 50.

The following instructive and amusing toys are very desirable:

35. Young Sportaman's Pistol, 25. 36. The Colortrope, 25, 37. The Blondon Top, 25c. 38. Young America's Arrow-Shooter, 25c. 39. Repeating Toy Pistol (with one round of wood balls) $1 40. Excelsior Spring Pistol, 40c.

All of these articles are sent by mail, prepaid, excepting Nos, 29, 30, 37, 38. 2 subscribers at $1 50 each will secure 75c. worth of these games or toys; 3 at $1 50 each, $1 worth; 4 at $1 50 each, $1 50 worth; 5 $1 50 each, $2 25 worth; and 10 at $1 50 each, $7 50 worth! No household in view of these offers should be without a series of good games for evening eterainments. Let every boy in the land, and girl too, get a set for themselves.

No. 39—Family Scales.—These scales combining the advantages of counter and platform scales, are peculiarly adapted to household purposes. They weigh from ¼ ounce to 240 lbs. They have a scoop or pan for weighing flour, sugar, and other house stores, and a platform for heavier articles, and are just such an apparatus as is needed for in-door or out-door use, occupying less than two feet square. These scales are manufactured by the well-known FAIRBANKS & Co., No. 252 Broadway New York, whose weighing apparatus has long ranked as the standard in all parts of the country. Send to them for circulars, if desired.

Nos. 45-53—Bailey's Patent Planes.—To those who have used these planes and know their value, it is but small praise to say that they are superior to any others made. They are so far ahead of any others that there can be no comparison between them. They are self-adjusting in every respect. Both the wood and iron planes are entirely independent in themselves, requiring neither hammer, screw-driver, nor wrench to replace or adjust the cutter, which is held firmly in place and can be instantly released by use of the cam and its thumb-piece. The cutter is adjusted by simply turning a thumb-screw under the bed-piece upon which the plane-iron rests. By this the cutter can be adjusted to any thickness of shaving. The Stanley Rule and Level Co., 55 Chambers Street, New York, warrant these planes to be of the best stock and finish. The various numbers and sizes of these planes which we offer gives carpenters, mechanics, and others desiring them, an opportunity to get a complete set of either the wood or iron planes as premiums. The smooth planes, of which we offer two sizes, are 5½ inches long, 1¾ inch cutter; and 8 inches long, 1¾ inch cutter.

Jack plane..	14	in. long, 2	in. cutter.	Iron.
Fore "	18	" " 2⅜	" "	
Jointer "	22	" " 2⅜	" "	

In the wood planes the lengths and widths of cutter embrace all sizes made. Forty-four subscribers at $1.50 each, or 141 subscribers at $1 each, will get a complete set of the wood-planes. Sixty-nine subscribers at $1.50 will get a complete set of the iron planes, which will last a life-time. If larger sizes than those given are wanted, a few extra subscriptions will be required, according to the difference in the price.

Nos. 54-76—Machinists' Tools.—This series of premiums, consisting of machinists' tools, etc., has been selected and put up at the suggestion of several practical men with whom we have consulted in regard to the subject. These gentlemen, who have a practical knowledge of the tools, and of the requirements of all who have any thing to do with the working of metals, give their unqualified approval of the tools we have selected. This list of premiums has been made so extensive that every man who has any industrial operttions to carry on will find some tool or tools absolutely necessary to him. By sending us clubs of subscribers to THE MANUFACTURER AND BUILDER these tools may be obtained by the smallest possible amount of labor. Of the qualities of these tools, in point of finish, we know them to be the best in the market—the best, without challenge. When a man has a set of any of them in his tool-chest, he knows he has the means of producing work equal to any that can be done. We obtain these tools from the general agents, Messrs. POST & GODDARD, 109 Liberty Street, New York.

No. 77—Foot-Lathe No. 1.—Of these useful articles we offer two kinds. No. 1 is perfectly adapted for most kinds of turning in wood or metals; also drilling, boring, polishing, sawing, etc. It seems to be the size desired by most people. This is proved by the great numbers of them sold. This lathe takes a piece between centres 19 inches long and 6¼ inches wide in diameter. It weighs 200 pounds. It is fitted with two pointed centres, one spur-centre, face-plate turned and polished, twe rests, one 9 and the other three inches long; also centre key and wrench combined, which fits the screw heads in different parts of the lathe. The balance-wheel weighs 45 pounds, is turned true, and is polished. It has two sizes for change of speed. This size of lathe has a great many extra parts made for it, so that whenever they are wanted they can be obtained. This is a very valuable point, as in buying other machines of the kinds only such things as happen to fit can be used, and they are not always to be found when wanted. The Rev. JOHN TODD, D.D., speaking of lathes, says in regard to these, "For price, for finish, for beauty and workmansip, I have never seen any American lathe so desirable. Of the No. 1 he says: "Nobody can own the lathe without daily gratitude." We procure these lathes through Mr. LUCIUS W. POND, 98 Liberty street, the well-known manufacturer of machinists' tools. Few people can obtain one of these lathes more easily than by obtaining 65 subscribers for THE MANUFACTURER AND BUILDER, for which we ship this premium, without any additional charge for boxing. The regular price is $50. We include leather belt 8 feet long, which costs 90 cents in the price given in the table.

No. 78—Foot Lathe, No. 2.—Our subscribers are frequently asking for second-hand lathes, saying at the same time that such a one would answer their purpose, and probably come cheaper. There are many others who do not care for so complete a lathe as No. 1. The No. 2, we think, will answer this demand. It is made of cheaper materials, but in the same style as lathe No. 1. The frame is of wood, with curved legs, which give it a neat and attractive appearance. It is painted and ornamented in the best style. The bed is made with iron slides three feet long. Will take a piece between centres 21 inchhes long and 6¼ inches in diameter. It has an iron pulley like No. 1. The spindle runs accurately. The face-plate takes off, and the centres are fitted to tapering sockets. Tailstock spindle traverses with a left-hand screw. Everything is well fitted and finished. The balance-wheel is the same pattern as for lathe No. 1, and is turned true. The lathe, with face-plate, long and short T rests, two pointed centres, spur-centre, and wrench, packed for transportation, costs $30. For this we also include the leather belt, 8 feet long, which is used on the driving wheel. We box this lathe and deliver it on the cars for a club of 47 subscribers at $1 50 each, or 124 at $1. The twist-drills and chucks—premiums 65, 66, and 69 to 73—especially the smaller sizes, are just the things for these lathes. The chucks, No. Ox, 2 and 3, cost $2 extra for fitting in the lathe. Those desiring further information in regard to the premium may send to WESTERN & Co., 37 Park Row, New York, for an illustrated pamphlet.

No. 79—The Dollar Steam-Engine.—This is a real working steam-engine and boiler, which runs half an hour, or until its fill of water is evaporated, by means of a small spirit-lamp, which forms a part of it. It can not explode or get out of order. A most instructive as well as entertaining toy. Sent, prepaid, for 5 subscribers at $1 50. It is manufactured by COLBY BROTHERS & Co.

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will be furnished free of charge in sufficient quantities to meet the reasonable requirements of agents. We would respectfully request that they do not waste them, but distribute them judiciously. If some unexpected event should prevent them from continuing in the business, they will do the square thing by us by giving their outfit to some friend, who will continue the business where they have left off; and who will no doubt be grateful for the opportunity of receiving profitable employment.

Postage.

Every subscriber pays his own postage at the office where he receives the paper. This is only twenty-four cents per year, or six cents per quarter, payable in advance.

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until everybody has been supplied with a circular and has had a chance to subscribe; and be sure that you leave your address, so that they may know where to find you in case they should make up their minds to take the magazine after you have left them. Make all drafts, money-orders, and registered letters payable to the order of Western & Company, publishers, and address all communications

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" " "	15	"	6 00	
" " "	20	"	10 00	
" " "	30	"	16 50	$1 50
" " "	40	"	24 00	4 00
" " "	50	"	32 50	7 50
" " "	75	"	48 75	11 25
" " "	100	"	65 00	15 00
" " "	200	"	140 00	40 00
" " "	500	"	350 00	100 00
" " "	1000	"	700 00	200 00

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It often happens that clubs are made up of numbers that are not found in the above table. Names may be added to clubs at the following rates:

In clubs of	4	and less than 10..	$1 25	for each name.			
" "	10	" "	15..	1 20	"	"	
" "	15	" "	20..	1 10	"	"	
" "	20	" "	30..	1 00	"	"	
" "	30	" "	40..	95	"	"	
" "	40	" "	50..	90	"	"	
" "	50	" "	200..	85	"	"	
" "	200	" "	500..	80	"	"	
" "	500	" "	1000..	80	"	"	
" "	1000	and over.....		80	"	"	

The Profits of the Cash Business, it will be seen by the above tables, are large and accrue rapidly. Every experienced canvasser knows that it is far easier to obtain 4 subscribers to a paper like THE MANUFACTURER AND BUILDER at $1 50 each than to get 1 subscriber to a high-priced magazine, costing $6. This is more strikingly evident when the fact is taken into consideration that our paper, costing only $1 50, is ACTUALLY SUPERIOR IN EVERY RESPECT TO ANY THING OF THE KIND IN THE COUNTRY COSTING TWICE THAT SUM.

There is another point in favor of our Magazine, as compared with a higher-priced periodical. This is the well-known fact, that in a manufacturing establishment, or even in a town, the working-men will rarely look at a paper costing $3 or $6, and the result is that only rich persons, comparatively, and proprietors can be solicited with any success. Now, these persons are scarce in any community; and a paper that comes within the means and comprehension of the masses or majority of the people, of course commands an immensely wide field. Hence, instead of getting only the proprietor of a manufactory, or the rich men of a town, the working-men can be approached with success; and out of a single establishment as many as 100 subscribers have easily been obtained. This is a very important point to canvassers, and where the large profits with but little effort come in. Try it.

Make all drafts, money orders, and registered letters payable to the order of WESTERN & COMPANY, Publishers, and address all communications,

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"The Manufacturer and Builder,"
37 Park Row, New York.

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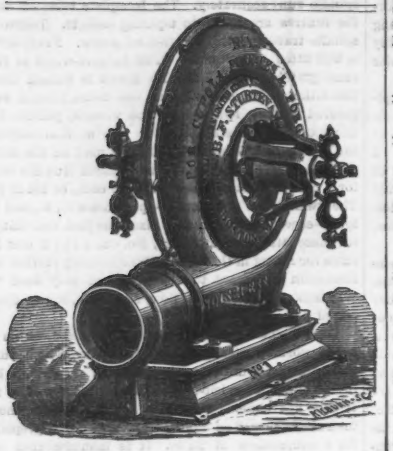
Advertisements admitted on this page at the rate of 40 cents per line. Engravings may head advertisements at the same rate per line, by measurement, as the letter press.

MACHINISTS' SUPPLIES.



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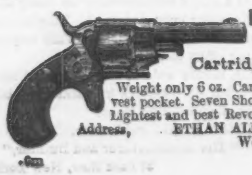

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PATENTS—No. 76,499, April 7, 1868. No. 96,465, Nov. 2, 1869.
No. 93,113, July 20, 1869 No. 106,606, Aug. 23, 1870. Address GEORGE N. MOWBRAY,
No. 94,969, Sept. 21, 1869 No. 106,607, Aug. 23, 1870. NORTH ADAMS, MASS.
[Feb. 21, 3m.]

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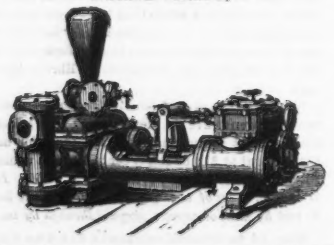

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